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TO THE PROFESSION:

For a number of years The Southeastern Surgical Congress has furnished the occasion for the getting together of the medical profession in the South, not only for the purpose of learning the newer methods in medicine and surgery but also that we might have the opportunity of personal contact with our fellow workers and of renewing, from year to year, old acquaintanceships and making new friends. This aspect of the organization applies equally as well to the wives and daughters as to the doctors. Each year a larger number are bringing their families with them that they too might know what these contacts mean.

Since the purpose of the Assembly is to disseminate the newer things of interest to the profession we welcome, not only those of our own membership but all others who would come and participate in the Postgraduate Course. We are glad to have you. We trust that from year to year you will come to look upon it as something you cannot do without. We have met in Atlanta on several occasions and each of these meetings has given us new and more pleasant recollections of the hospitality of this great city in our Southland. It is intended that this year's meeting shall be a Defense Meeting in order that we might carry away new ideas of what the Federal Government expects of the medical profession in furthering its aims to the end that totalitarianism and slavery shall vanish off this earth and democracy shall be the government of the future and all peoples shall be free. Come and be with us at this meeting.

JULIAN L. RAWLS

SURGICAL TREATMENT OF CARCINOMA OF THE STOMACH

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THE frequency with which articles on cancer of the stomach are appearing in the medical literature indicates a renewed interest on the part of the profession generally in this important problem. Unless one studies this accruing literature in some detail, little enthusiasm will be gained as to the progress which is being made in the treatment of this subject.

The seriousness of the frequent occurrence of cancer of the stomach may be visualized when one appreciates the parallels which have been drawn by Livingston and Pack⁸ as they regard the death rates in this country. These authors state that during our national life our country has engaged in six major wars which lasted, all inclusively, 15 years. During this period of years at war our country has lost 244,357 soldiers who were killed in action and who died from wounds. During the 15-year period from 1923 to 1937, inclusive, 441,912 persons died from injuries received on the highways of the United States. On the basis of 40,000 deaths a year from cancer of the stomach, as described from figures furnished to Livingston and Pack by the American Society for the Control of Cancer, the total deaths in the United States from cancer of the stomach for a 15-year period would be 600,000.

It is believed that approximately one third of all the cancers occurring in man are located primarily in the stomach. It is felt that there are probably 150,000 patients living in this country now who are suffering with this disease. The general opinion would indicate that possibly 18 per cent of this group, or 27,000 of such cases, are suitable for our present day method of treatment^{8, 10}.

When one considers that since the time of the first reported successful gastric resection by Billroth in 1881, there have been reported only about 3,000 gastrectomies for cancer of the stomach in this country, it may be readily seen that the patients with gastric carcinoma are not being recognized or offered treatment—at the curable stage. The total number of gastrectomies for cancer of the stomach reported throughout the world during this period has been approximately 15,000 cases. This dismal picture of the frequency of cancer of the stomach and the disastrous outcome in a large percentage of cases may be brightened considerably when one appre-

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ciates the satisfactory results which are being reported from the large medical centers which have had the opportunity to treat a considerable number of these patients. Balfour² reports a cure of 48 per cent of his cases of gastric resections at the Mayo Clinic when the cancer was limited to the stomach itself. He reported an incidence of 30 per cent cures in cases that were resectable in the presence of glandular involvement. These figures of Balfour's do not take into consideration the number of people whose life expectancy has been extended for a period of from one to five years as result of their operations. Balfour's series is probably the largest appearing in the American literature. Other authors are reporting similar gratifying results.

In a study of 126 autopsies of cancer of the stomach, Warwick¹¹ found that 23 per cent of the patients had died from simple starvation or from toxemia incident to the disease without demonstrable metastases.

It is generally agreed that, if patients with cancer of the stomach have any opportunity whatsoever for a cure, the only effective treatment is resection of the growth. Due to the unorthodox symptoms which are prone to occur as result of this disease, much difficulty has been encountered in educating the public as to the importance of early gastrointestinal distress; a like difficulty is encountered in impressing the practitioner in medicine with the necessity of serious and detailed study for this group of patients. The symptoms described in the older textbooks, which have acted as a guide to many clinicians, have actually been the symptoms of the results of cancer and not the symptoms of cancer of the stomach in its remediable stage.

Recently Abrahamson and Hinton¹ in a review of 400 cases found that only 5.4 per cent of their cases were suitable for resection and other writers have reported a similar low incidence of resectability. Lahey⁶ has reported an incidence of resection of 25.7 per cent of those coming to him for treatment.

It is probable that some intermediate figure can be arrived at as to the general resectability of cases of gastric cancer over the country generally. The average resectability among the groups of men particularly interested in this subject is from 18 to 20 per cent. Many factors must be considered when an attempt is made to evaluate the relative operability of patients in the hands of surgeons generally. First, the type of patients ordinarily seen by a clinic, that is, whether these patients were referred with the expectation of surgery, or whether they sought treatment only after their lives had been made unbearable by the disease; second, the experience

of the surgeon in the handling of gastric resections. Many well trained surgeons have manifested for various reasons very little interest in the problem of gastric cancer. The assumed hopelessness of the problem has not offered an inviting effort. Certainly no honest, conscientious surgeon, with a limited experience, would care to operate upon this class of patient, knowing that he was limited in his ability to remove satisfactorily the portion of the stomach or the organ in entirety, if the occasion demanded such treatment. Third, it is felt that the limited physical facilities available for the diagnosis, operating facilities and after care of these potentially serious problems have influenced to some degree the resectability of patients in the hands of certain groups of men. With all these factors considered, one may well understand why we find such a great relative difference in the various groups of patients which are found applicable to surgical relief.

One of the most hopeful aspects of this problem may be gained by agreeing with the opinion of MacCarty⁹ that cancer of the stomach often begins as a limited disease in the stomach and it remains so limited occasionally for a long period and it is during this stage when the lesion is limited to the stomach that our greatest number of cures may be expected as a result of treatment.

The variable group of clinical symptoms shown by these people serves only to confuse the picture and make the early diagnosis obscure except when they are seen by the most cancer-conscious clinician. Unfortunately the medical profession as a whole views this disease with a degree of hopelessness that is not justified today. It is our problem to impress upon our own profession the knowledge that cancer of the stomach is not always hopeless.

Patients ordinarily consider mild indigestion a normal concomitant of age: since cancer of the stomach is most often seen in people beyond middle age, the disease frequently gains much headway before a detailed study is considered necessary. There is no classical or clinical picture to be expected in the early stages of cancer of the stomach, unless the tumor is so located or of sufficient size to offer early blockage of the outlet or inlet of the stomach. Lesions occurring primarily in the fundus of the stomach or cardiac end produce few symptoms until there is either an invasion of distant parts by metastasis or until the toxic effects of the neoplasm cause metabolic changes. Cancer of the stomach often simulates diseases of any portion of the gastrointestinal tract from the stomach to the descending colon. Mullen¹⁰ has recently stated that he doubted whether cancer ever occurs in a relatively normal stomach. He feels that the various types of chronic gastritis, either atrophic or hyper-

LABORATORY AND PHYSICAL FINDINGS

Anemia	49	cases
Hypoacidity	59	"
Hyperacidity	3	"
Normal Acidity	11	"
Mass in Abdomen	20	"
Tarry Stools or Blood in Stools	39	"
Gross Gastric Blood	12	"
Glands Involved at Operation	18	"

AGE INCIDENCE

1. 30 - 40 yrs.	6
2. 40 - 50 yrs.	10
3. 50 - 60 yrs.	15
4. 60 - 70 yrs.	23
5. 70 - 80 yrs.	17
6. 80 - 90 yrs.	3
	<hr/>
	74

74 CASES OF CARCINOMA OF THE STOMACH

40 Inoperable

34 Operable

5 Laparotomies

2 died in hospital

3 died within 1 year

5 Palliative Gastro-enterostomies

1 died in hospital

4 died within 1 year

24 Gastrectomies

5 died in hospital

5 died within 1 year

13 lived

1 year1

2 years2

3 years4

4 years1

5 years1

6 years1

7 or 8 years2

10 years1

1 died after 3 years—coronary attack

1 died after 4 years—tuberculosis

trophic, are productive of malignancy of the stomach. Pain as a factor is a most variable problem. A few of these patients complain of extreme discomfort in the epigastrium while others have little or no discomfort. This pain may simulate the typical pain of a peptic ulcer, showing food and alkali relief. Patients with lesions in the pyloric or prepyloric end of the stomach ordinarily have pain after the ingestion of food. Many of them have had longstanding gastric distress and in many instances they are aware of the change in the character and time of their pain and such changes have created a

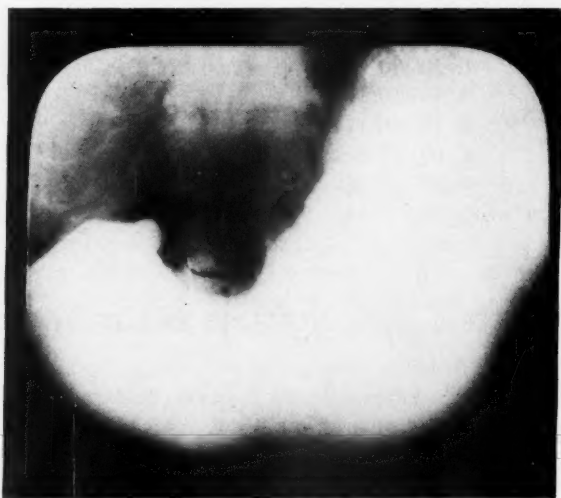


Fig. 1 A. Marked gastric retention. Large prepyloric tumor palpable (Case 1).

Case 1. Mr. C., aged 78, admitted on March 25, 1935, gave a history of long standing gastric distress, culminating in copious vomiting for two months prior to his admission: for two weeks he had retained no food. The stomach was completely blocked by a large tumor which was easily felt through his abdomen. No free hydrochloric acid was present in the gastric contents. He had 2,800,000 red cells with hemoglobin of 60 per cent. Resection of a massive adenocarcinoma with many involved retrocolic metastatic glands was performed on March 30. At the time of this report he is clinically well.

concern on their part. Anemia seems to be an early and rather constant manifestation, certainly after the disease has gained some headway. This anemia is, of course, more pronounced in patients who have had a history of loss of blood, although it is frequently seen in people who are not aware of any blood loss. Demonstrable blood in the stools has been a rather constant observation. Early nausea and vomiting is most often seen in patients with a lesion obstructing the gastric outlet. Gastric hypoacidity or anacidity is

one of the most constant findings. Normal acidity or hyperacidity, however, may occur in gastric malignancy.

Dean Lewis⁷, Holman and Sandusky⁴ have re-emphasized hypoacidity in its diagnostic value in the study of gastric cancer. Comfort, Butsch and Eusterman³ have called attention to a group of patients with gastric symptoms and persistent hypoacidity; they have noted the relative frequency with which gastric malignancy develops in the group. This observation strongly suggests the advisability of re-checking patients frequently who have an absence of gastric acids.

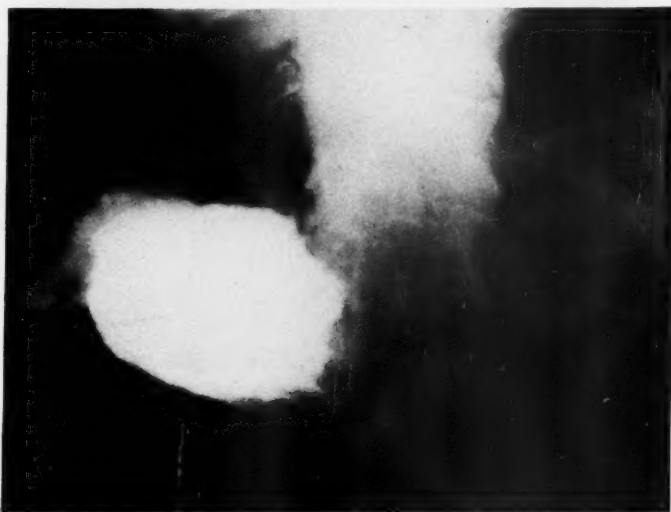


Fig. 1 B. Three years after resection and Billroth-I repair (Case 1).

The question of differentiating a simple ulcer and a malignant ulcer in the stomach is not simple. Probably when such a differentiation is necessary, it is of more academic interest than of real value because any large gastric ulcer that is questionable in character should be considered as a possible cancer and resection performed.

Jordan⁵ has called attention to a method of differentiation of malignancies from simple ulcers by putting such patients on a strict ulcer management and watching the progress of the healing process in the ulcer cases by repeated x-ray examinations. Recent work has shown that actually malignant ulcers do undergo some healing process under certain conditions and it is doubtful whether this method of differentiation can be depended upon.

Detailed x-ray studies as a diagnostic procedure are available to most of us. When this study is carried out by a well qualified roentgenologist, its diagnostic value is invaluable. Great emphasis is

being placed upon the necessity of routine x-ray examinations of stomach and intestinal tract of all patients who offer any suspicion of disease whatsoever in this region. Of course small and early changes in the gastric mucosa are not always easily discernible. With the improvements in technic which are employed today for x-ray studies, little opportunity is offered for a failure to visualize gastric disease. If progress can be made in the treatment of this problem,

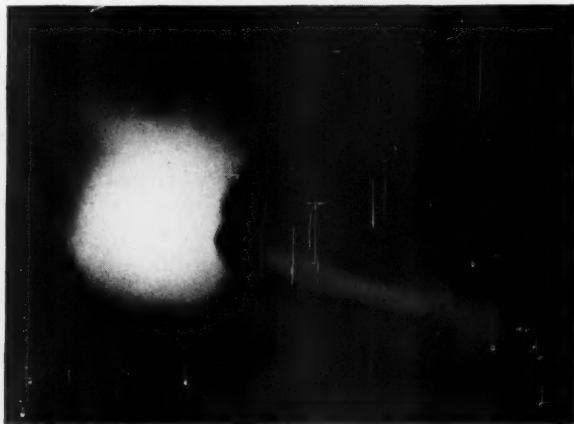


Fig. 2 A. Considerable gastric retention. Prepyloric tumor palpable (Case 2).

Case 2. Mrs. W., aged 72, admitted June 26, 1931, had lost 50 pounds in weight. For nine months prior to admission she had suffered with nausea and gastric distress, although vomiting had not been prominent. Three weeks earlier she had a massive gastric hemorrhage with resulting shock at which time her life was despaired of. When I saw her she had a large palpable mass in the epigastrium. Gastric analysis showed an absence of free hydrochloric acid; the red blood count was 2,450,000, hemoglobin 45 per cent. She was given several direct transfusions of whole blood in the course of her preoperative preparation. On July 6, a massive adenocarcinoma with many involved retrocolic metastatic glands was resected. At the time of this report she is clinically well.

such progress must be directly dependent upon the frequency with which we are able to pick up early lesions in the stomach by often repeated x-ray examinations. The roentgenologists are in many instances able to offer valuable advice as to the operability of these patients. I doubt, however, the wisdom of relying too consistently upon their advice because, after all, many of these cases are found amenable to surgery when there is gross evidence to suggest an inoperable state. Unless there are uncontradictable evidences of distant metastasis, it is felt that patients with cancer of the stomach should be explored in the hope of being able to resect the malignancy.

The importance of gastroscopy is being appreciated in recent years. In certain rare cases where the x-ray has not been able to establish the diagnosis, gastroscopy is invaluable. It is regretted that the two regions of the stomach most difficult to study with the x-ray, namely the posterior wall and the prepyloric region, are also most difficult to visualize properly with the gastroscope.

There is no existing question as to the selection of treatment which is indicated in patients with gastric cancer. Surgical excision of the growth, with a margin of healthy tissue to spare, offers our



Fig. 2B. Four years after resection and Billroth-I repair (Case 2).

only hope of controlling this disease. The question of the restoration of the gastrointestinal continuity must be forgotten in one's attempt to remove the neoplasm completely. Certainly no surgeon should attempt to employ surgical treatment for cancer of the stomach who doubts his own ability to restore this continuity for all physiologic purposes. In the event of any such indecision, the surgeon's primary decision as to the operability of a given case may be materially influenced.

There are no hard and fast rules as to when a given case may or may not be resected, except the definite presence of distant metastasis. Many cases which appear upon early palpation not to be

resectable, are found to be operable after a more detailed and painstaking effort. I have resected with gratifying results patients that were denied operations by experienced and qualified surgeons. In this particular field the surgeon will not be condemned for unusual radical practices because he is dealing with a disease which is acknowledged to carry 100 per cent mortality without complete excision. In consequence when there is a reasonable belief that the lesion may be circumscribed by excision, certainly the attempt should be made.

In this particular field of surgery there will be observed many exploratory procedures when nothing has been accomplished as result of their practice. It is my belief, however, that only by the frequent effort to determine the operability of these cases by exploration may we be able to increase the number of our resectable cases. Palliative procedures, such as gastroenterostomy, have been and must necessarily be continued to be practiced in a small percentage of these cases. Pack and Livingston⁸ have shown, however, that the mortality of the palliative procedures is actually higher than is the mortality of subtotal gastrectomy. This phenomenon is occasioned, of course, by the extent of the disease in the cases in which palliative procedures must be adopted. The life expectancy in the patients who have palliative operations for gastric cancer is rarely more than two or three months.

I do not think that this is the time or the place to enter into a discussion as to the relative merits of the various and often ingenious technics employed for the resection of a portion of the stomach or the stomach in entirety. In my own group of cases will probably be found a more frequent employment of the Billroth-I operation than is found generally in other clinics. I appreciate the dangers of the practice of this form of anastomosis too frequently and I am acutely aware of its limitations. This operation may be done more quickly than most of the other popular types requiring anastomosis between the stomach and jejunum. It is definitely preferable when operating upon old and debilitated patients, where time is a factor and when the lesion is limited to the pylorus. Of course the Billroth-I operation cannot be done when widespread resection of the stomach is necessary except in the event of unusual mobility of the stomach and duodenum. This operation, of course, is to be avoided when there is any resulting tension upon the suture line. The various modifications of the Polya operation will enable one to restore the gastric continuity without difficulty. When the major portion of the stomach has been resected I perform a Hofmeister modification of the Polya operation which is actually an antecolic anastomosis.

SUMMARY

1. The assumed number of cases of gastric cancer in this country and the number of resections being reported would indicate that the operation is not being employed with sufficient frequency.

2. Evidence is offered to show that gastric resection is applicable in between 18 and 20 per cent of the patients applying for treatment of this disease.

3. Frequent exploratory procedures to determine the resectability must be employed if the cases remedial to surgery are to be appreciated.

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SUBDURAL HEMATOMA IN INFANTS

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SUBDURAL hematoma in infancy and early childhood is seldom thought of in differential diagnosis. Like many other relatively rare conditions, all too frequently it passes unrecognized for this reason. Given a child with slight to moderate enlargement of the head, in whom hydrocephalus is suspected, subdural hematoma should be considered particularly when the facial expression is more intelligent than that of the average hydrocephalic child. Diagnosis is readily established by bilateral subdural puncture.

We discuss the signs and symptoms which should suggest subdural hematoma, report a group of nine cases with this condition, and compare these results with those previously reported from this clinic by Peet and Kahn⁴ in 1932.

DIAGNOSIS

Subdural hematoma should be suspected in that group of cases with a slight to moderate enlargement of the head in which the fontanel is tense, enlarged, or both. Infants with feeding problems, convulsions, palsies, opisthotonus, meningeal signs, drowsiness, with or without a history of injury, warrant consideration of subdural hematoma.

We have been impressed with the frequency of this condition in the illegitimate, bottle-fed, poorly nourished infants. This suggests that they are either more exposed to injury or develop subdural hematomas more readily than well nourished, breast-fed, healthy children with the otherwise minimal trauma of ordinary activity. The former rarely receive any vitamin C, or occasionally obtain this in small amounts, while the latter usually receive adequate dosage through breast milk and supplementary feeding. We believe that this has some etiologic significance. Ingall¹, who reviewed the cases of Sherwood² for other evidence of vitamin C deficiency, found a high percentage of this deficiency in those cases. This concurs with our experience in the two series.

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Aside from the above-mentioned predisposing factors of vitamin C deficiency and poor general care and diet, trauma is undoubtedly of frequent occurrence in "normal" infancy. The theory of antero-posterior motion in polar injuries tearing the cortical veins as they cross the subdural space to reach the large venous sinuses seems fairly well accepted. Since the osmotic pressure of hemolysed blood is greater than that of the plasma (Gardner³), the increase of fluid content within the false membrane is not surprising. In addition to this, the fine, thin-walled capillaries of the outer membrane may also bleed from time to time. The increased capillary fragility in scorbutic patients may also play some part in this. This factor is particularly well supported by the fact that not infrequently the fundi in these cases show more hemorrhages than one would expect in relation to the amount of papilledema present; in fact, these hemorrhages are seen at times without papilledema.

Fontanel puncture of the subdural space, when indicated, is not a difficult procedure. While it should not be used indiscriminately, in careful hands complications from it are relatively rare. We employed it in cases where subdural hematoma was at best an outside possibility, wherever there was an indication of increased intracranial pressure. The technic is well described by Ingraham and Heyl², and has been used in this clinic for some time. We almost invariably investigated the subdural space in cases where moderate idiopathic hydrocephaly seemed a more likely diagnosis than subdural hematoma, employing for this type of case a longer needle. When no subdural hematoma was encountered, we then continued to insert the needle until the ventricle was entered, thus combining this procedure with a cortical estimation.

CASE REPORTS

The majority of our cases are given in tabular form (table 1). Cases 5 and 7 are reported in detail. Case 7 is of particular interest in that it is, as far as we know, the only reported example of an infected subdural hematoma in an infant. The other eight cases were all chronic subdural hematomata. Six cases had bilateral lesions, while in two the lesion was unilateral.

CASE 5.—E. B., a boy aged 10 months, who had had a normal delivery, was admitted Aug. 23, 1938, having been in good health until two weeks before admission, at which time he began to vomit his feedings. For one week before admission a rash had been noted over the arms and legs. A few days before entry the vomiting became projectile. Irritability was noted, and two convulsions occurred on the day of admission. The patient had been breast-fed during the first three weeks of life, without supplement. At the age of three weeks a supplementary formula of milk, with cod liver oil and vitamin

SUBDURAL HEMATOMA IN INFANTS—Dowman and Kahn

Case No.	Sex	Location	Age on admss. (Mos.)	P.I.	C.C.	Feeding	Birth	Examination	Operation	Condition on Discharge	Follow-up.	Remarks
1.	M	Bilat.	9	4d.	Convulsions	Formula CLO none OJ none*	Normal	Large head, blind, retinal hemorrhages marked, meningeal signs, flaccid palsy of left arm.	Two small flaps	Fair, blind.	2 mos., rolls over in bed, does not sit alone.	
2.	M	Unilat.	12	16d.	Spells, Fell 21 days before.	?	Normal (?)	Large normal, opisthotonus, macular hemorrhages.	Trephine small flap, flap excised	Poor ?	21 mos., walks a few steps, convulsions. Encephalogram, shows brain atrophy. 45 mos. active, aphasic.	
3.	M	Bilat.	4	1m.	Convulsions	?	(?)	Large head	small flap,	Died 6 hrs. post-op.		
4.	M	Bilat.	6	1m.	Large Head Convulsions	Formula CLO none OJ none	Normal	Sl. large head, blind, increased tone, retinal hemorrhages marked.	Two small flaps.	Still blind	2 mos., blind, tries to sit. 27 mos., single convulsion, blind, makes no effort to move.	
5.	M	Bilat.	10	2w.	Vomiting Projectile Vomiting	Formula CLO yes OJ none	Normal	Sl. large head, sl. blurred discs, neck stiff.	One small flap	Excellent.	2 wks., 2 mos., 7 mos., well. 18 mos., head asymmetrical, veins prominent, well.	
6.	F	Bilat.	6	1m.	Feeding problem, fell 1 mo. before	Breast 3 wks. Form. CLO yes	(?)	Head normal, fontanel large & tense, sl. papilledema.	One small flap Tapped.	Excellent.	9 mos., walked age one year, tries to talk, sees well.	
7.	M	Unilat.	7	2m.	Large head, Jacksonian convulsions.	OJ none Breast 2 wks. Form. CLO & OJ	Normal	Lg. head, opisthotonus, spasticity, ?blind?	Thorotrast, double trephine	Fair.	5 mos., uses all extremities well, sees well, transient internal strabismus, arm slightly spastic.	Infected hematoma.
8.	M	Unilat.	7	?	Under-nourish.	Breast 1 wk. Form. CLO & OJ	Normal	Lg. head, fontanel tense, ?sl. disc pallor, ?spastic?	Small flap.	Good.		Illegitimate
9.	F	Bilat.	13	3m.	Head Large Head	Breast 1 wk. Form. CLO & OJ	Normal	Lg. head, fontanel large, extremities small.	Two small flaps.	Good, sits alone, alert.		Family history of syphilis.

*CLO, cod liver oil; OJ, orange juice.

D was given. At three months the breast feedings were discontinued, the formula being continued, and canned pureed vegetables being added. No fruit juices were given at any time. Twice during the week before admission the infant had fallen off the bed.

The infant was irritable, but not acutely ill. The temperature was 37.2 C. (99.0 F.) rectally. The significant findings were an asymmetry of the parietal areas of the head over which the percussion note was hollow, a head 47 cm. in circumference, a bulging and slightly pulsating anterior fontanel which admitted two fingers, a moderately stiff neck, and fundi which showed slight blurring of the disc margins. The skin over the extensor surfaces of the arms and legs showed eight to ten discrete, dusky, red papules about a millimeter in diameter. One lesion was surrounded by a purpuric area about a centimeter in diameter.

The admission white blood count was 18,300, with 64 per cent polymorphonuclear leukocytes. Other blood and urine examinations were normal. The blood Kahn test was negative. Lumbar puncture showed a pressure of between five and six hundred millimeters of water. The fluid was bloody, but on centrifuging the supernatant portion was clear. X-ray examination of the skull showed a spreading of the sutures. Fontanel puncture of the subdural spaces on the following dates gave the following results: Aug. 25, 1938, on the right side, 50 c.c. of slightly bloody fluid, on the left, 10 c.c. of very bloody fluid; then on August 30, the right puncture netted 70 c.c., the left 8 c.c.; on the third puncture done on September 1, 55 c.c. of yellow fluid was obtained from the right side and replaced with an equal amount of air, 65 c.c. of bloody fluid was obtained from the left side and replaced with an equal amount of air. X-ray films made following the air injection showed air in both subdural spaces, with residual fluid present on both sides.

Two more bilateral taps were done, the fluid on the left continuing bloody, that on the right becoming serous. On September 9, operation was performed on the left, the right side being aspirated on the table before the operation was begun. Local anesthesia, supplemented with barely enough ether to keep the patient quiet, was used. The patient's postoperative condition was fair. On September 11, when the dressing was changed, a pressure area was noted over the right parietal area. This sloughed, and was granulating by October 16. This, however, definitely precluded surgery for the right hematoma. The left side was aspirated three times postoperatively, the last tap yielding only 1 c.c. of fluid. Ten postoperative punctures were done on the right side, the last one producing 15 c.c. of clear fluid. The patient was discharged on October 16, 1938, and advised to return in two weeks.

On readmission the granulations had epithelized. On right fontanel puncture only 1 c.c. of bloody, xanthochromic fluid was obtained from the subdural space. On lumbar puncture 30 c.c. of crystal clear fluid was removed. This contained 3 lymphocytes per cubic millimeter. Since such a small amount of fluid was obtained from the right subdural space, the plans for operation were abandoned. The patient was discharged on November 6, and requested to return to the outpatient clinic.

A month after dismissal from the hospital the patient was well. His appetite was good. There had been no vomiting. The fontanel receded on sitting, with normal pulsations, and was flat when the patient was in the prone position. An attempt at walking was developing. When last seen on May 20, 1939 the patient was well and appeared quite intelligent. The fontanel was completely closed.

A letter written April 15, 1940 stated that the child was of normal intelligence, used his arms and legs well, had normal bathroom habits, and that his vision was good. The left side of the head was reported as being "higher than the right, with prominent veins." No convulsions or evidence of headache had been noted.

The fact that in this case the right subdural accumulation cleared with aspiration alone is of interest. We believe that aspiration alone should be employed usually for a maximum of four or five times. Unless the hematoma is no longer demonstrable, operation is indicated. In this case the operative approach was blocked by the infected scalp area. In view of the last report that the right calvarium was flatter, this child may well still have some handicap of development of the right hemisphere due to a persistent constricting hematogenous pseudomembrane. When last seen, however, the improvement was so marked that operation did not seem justified.

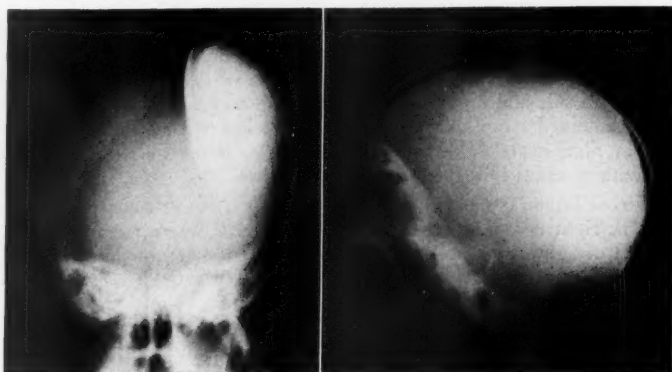


Fig. 1.—Thorotrast in an infected subdural hematoma cavity (Case 7).

NOTE: This figure is also being used in Dr. Kahn's paper, "Contrast Media in Cysts and Abscesses of the Cerebral Hemisphere," which will appear in an early issue of *Surgery, Gynecology and Obstetrics*.

CASE 7.—R. F., a boy aged 7 months, a normal delivery, was admitted on Oct. 16, 1939. He had been breast fed for two weeks, and was then placed on a formula. No cod liver oil or orange juice was given. At the age of four months the child was admitted to another hospital with the complaints of crying when being handled and purple spots over the body for three or four days. A diagnosis of otitis media and pneumonia (x-ray) was made. A month later the x-ray of the chest was clear, but the child had lost weight and was almost moribund. After another week the child was stuporous, respirations were shallow, and twitchings of the right face were noted. Later a spastic quadriplegia with flaccid paralysis of the right face developed. The child slowly improved sufficiently with parenteral fluids to be moved, and was brought to the hospital.

When seen on Oct. 16, 1939, examination showed a markedly emaciated and dehydrated apparently moribund infant weighing 10 pounds. The head was greatly enlarged, with the anterior fontanel slightly open on the left, a larger left calvarium, and a separation of the left parietal sutures of 3 mm. The eyes would turn to the left but not to the right, and did not follow moving objects. The pupils were equal, reacting sluggishly to light. A right abducens palsy was present. The right face drooped, and the head was turned slightly to the right. The neck was rigid, and opisthotonus was present. There was a slight slow movement of the extremities, with marked spastic tetraplegia, hyperreflexia, and extensor plantar reflexes.

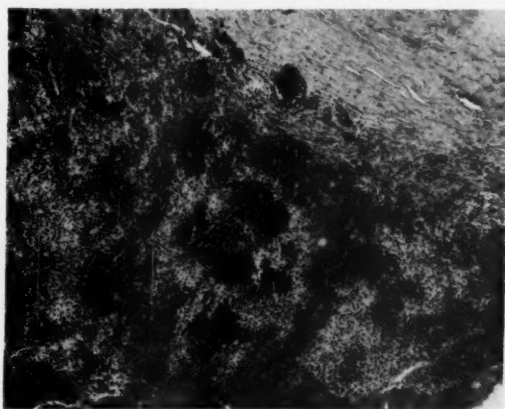


Fig. 2.—Photomicrograph of the membrane in Case 7. Description by Dr. C. V. Weller: "Late subacute to early chronic purulent inflammation with vascular pyogenic granulation tissue, in which there are many lipid containing phagocytes. The hematoma is old probably dating from birth."

A tentative diagnosis was made of an abscess of the left frontal lobe. Intravenous fluids were exhibited immediately, and the left anterior fontanel was needled. The stilette was left in place until a depth of 3 cm. was reached, then withdrawn. Forty-five cubic centimeters of thick greenish-yellow pus under increased tension were obtained, and 15 c.c. of thorotrast injected. Culture of the pus showed *Staphylococcus aureus*. The x-ray films, much to our surprise, showed opaque media in a large left subdural space (fig. 1). On the following day, 30 c.c. of pus was aspirated. On October 18, under local anesthesia, a left double trephine with partial excision (fig. 2), through and through irrigation, and wide drainage were performed. The drains were removed on the sixth day after operation, and the wounds were then almost healed. When he was discharged from the hospital on Dec. 3, 1939, the child was much less spastic.

On examination April 1, 1940, the patient weighed 23 pounds. He was unable to sit alone but could follow objects with either eye, and made attempts to use the slightly spastic right arm. The other extremities were used fully. There was a transient inconstant right internal strabismus and a right central type of facial paresis. The reflexes were physiologic.

TREATMENT

Depending on the condition of the infant and the presence or absence of associated diseases, operation may safely be postponed even for a week to ten days. In this period repeated daily or less frequent subdural aspirations can be performed for the control of the increased intracranial pressure. General measures, such as high vitamin diet, transfusion, or other indicated therapy are carried out during this period.

Operation is best performed under local anesthesia plus a very little ether, with codein preoperatively in small doses. A reliable route for intravenous fluids (usually it is simplest in infants to cut down on the vein) is established, and blood is started at the beginning of the operation. In bilateral cases the opposite subdural space is aspirated and all obtainable fluid is removed. This is done before the flap is begun in order to prevent the sudden death that might otherwise occur due to the sudden lateral shift of the cerebrum toward the operated side, producing midbrain-tentorial embarrassment. Once shock has supervened it is almost impossible to reverse this process, and subdural puncture of the remaining hematoma space is of no benefit. In these cases, therefore, it is more important that shock be avoided by every precautionary effort.

Because of the mobility of the scalp in infants, a small sickle-shaped incision gives adequate exposure, and can be closed more quickly than the classic horseshoe incision. A single trephine or gouge-opening is made, and the bone flap cut with heavy scissors. An opening 4 to 5 cm. in diameter is entirely adequate. Should the dura be opened in this process, it is of no serious moment; in fact, it frequently is opened because of its adherence to the suture lines. The dura is then incised or the opening enlarged, the outer membrane stripped from the overlying dura for a small distance and then opened. The contents of the sac are now evacuated. Using a lighted retractor, the limits of the sac are explored, and as much as possible of both the outer and inner membranes excised. It is not safe to remove the membranes along the falx or in other regions where the vessels bridge from cortex to dural sinuses. The inner membrane may be difficult to identify but is readily lifted or dissected from the underlying pia. The entire wound is now irrigated with Ringer's solution, the dura loosely closed, the bone flap replaced, and the galea and scalp closed in two layers without drainage. Owing to the rather poor general condition of these children it is important that surgery be performed as rapidly as accomplishments will permit, in contrast to the similar problems in adults.

Postoperatively, the head is placed in a dependent position to encourage obliteration of the previous subdural cavity. Intravenous fluids are given slowly until mouth feedings are taken. Daily aspirations of the operative wound are usually necessary at first, but the frequency of these is gradually diminished as the amount of fluid lessens. Since this series was completed one of us (E. A. K.) has done a case in which postoperative aspiration was never necessary.

In bilateral cases the unoperated side requires aspiration as before operation. After about two weeks the second side is operated upon. In two of our cases, 5 and 6, this second stage apparently was not necessary, for by the time the patient was ready for the second operation no further fluid was to be aspirated from the unoperated side, and the patient was well. These may correspond to those cases described by Ingraham and Heyl² in which, on trephine, no membrane was seen.

It is quite possible that the small, fine inner membrane, which occurs in the early cases, may well be overlooked. It seems impossible to conceive of a true subdural collection of slightly to moderately bloody xanthochromic fluid occurring without some limiting pseudomembrane surrounding it. The possibility that these cases have a large pooling of subarachnoid fluid should be considered.

Aspiration, with its ever-present risk of secondary infection, is a far better diagnostic than therapeutic procedure, and should be used as such. One cannot hesitate to condemn punctures repeated fifteen to twenty times, with increasing risk of infection, in the vain hope that an encapsulated granulation-tissue pseudomembrane will quit secreting.

The method of draining through trephines, suggested as a possibility in the paper of Peet and Kahn⁴, is not used here since our unfortunate experience in Case 2, where a bone flap was necessary for drainage (after trephine drainage was not effectual), and the bone flap had to be sacrificed sixteen days later due to infection. The ultimate result in this case left much to be desired. We believe, if used at all, that trephine is safer as a preliminary to confirm the presence of a membrane only when one is prepared to turn a flap immediately if such membrane be found.

SUMMARY

Nine cases of subdural hematoma in infants are reported. Case 7 was treated by double trephine and drainage, since the lesion was infected, the child's condition exceedingly poor, and it was felt that less bone had to be sacrificed by this method. The other eight cases were subjected to osteoplastic craniotomy as described, with only

one fatality. This compares favorably with the series of Ingraham and Heyl², and is much better than our previous series⁴, in which there were nine cases with five deaths. These more favorable results are, we feel, due to three improvements. First, the entire procedure is carried out under local anesthesia, with drop ether carried only to the stage of sedation, and never to the level of surgical anesthesia. Second, the smaller incision employed in this group, which facilitates closure, and thereby reduces the total time of operation, lessens the amount of surgical shock. Third, transfusion is begun when the patient is put on the operating table, which is of value in preventing shock. These infants are rarely saved once shock supervenes.

Late results in our cases which survived show two cases definitely retarded and two cases apparently normal. In the last three cases operation had been too recent at the time of the follow-up to draw definite conclusions. Case 1 could not be followed.

In Cases 5 and 6, although the lesion was apparently bilateral, the unoperated hematoma cleared after repeated aspirations. It may be that these unoperated hematomas had no membrane, and fall into the group mentioned by Ingraham and Heyl², which cleared after trephine alone, although xanthochromic spinal fluid leaking into the subdural space cannot be excluded in these cases. Where the fluid becomes serous and protein-free after several taps, with no further bleeding, it is theoretically possible that in early cases with very fine membranes the lesion might retrogress without operative treatment. In our experience, however, this rarely occurs.

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HORSESHOE KIDNEY AND ITS CLINICAL MANAGEMENT

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OF THE various congenital abnormalities which may occur, none may be of more importance than that of the kidney, the physiologic necessity of which is paramount. With intravenous urography we are able to study the function and behavior of the malformed kidney and from information obtained intelligent management may be instituted.

The metanephros (permanent kidney) are separate structures, making their appearance in embryo at about the fourth week. During the next five weeks, ascent and rotation should take place when they assume their normal position in the renal gutter and it is at this time that the renal vessels become manifest. Should some interference in ascent and rotation take place during this period, renal malformation or fusion may occur. The resultant anomalies may include hypoplasia, supernumerary, ectopy, malrotation and horseshoe variety.

While this discourse deals with the clinical management of the horseshoe kidney it would not be digressing to consider briefly the non-rotating variety which in every sense of the word differs only in its absence of an isthmus. In the non-rotated and horseshoe kidney, the plane of the kidney is not unlike. In each the pelvis assumes an anterior position with its infundibulum and calices pointing backward and mesially. There is no appreciable difference in the anatomic relations of the ureter in either of the two conditions.

The blood supply, with few exceptions, is made up of two or more anomalous vessels entering into the hilum both above and below the renal pelvis, and in each case pulsation of the inferiorly placed vessels against the ureter may contribute to interference with waves of peristalsis along the ureter. It has been noted that a scant amount of fat surrounds the ureter at a point where it crosses over the lower pole of the kidney, and it is believed that this absence of shock absorber effect likewise inhibits waves of peristalsis. Some writers are of the opinion that the ureteral attachment to the pelvis is naturally placed higher but this has not been substantiated as having occurred in the course of early life before symptoms are manifest. Hence, it may be readily seen that over a period of time pyelectasis would occur with retention, stasis, infection, and possible stone formation.

Presentation before the Staff of SS. Mary & Elizabeth Hospital, Jan. 16, 1942.

In the true horseshoe cases I have had occasion to operate upon, it was noted that the intercommunicating renal tissue (isthmus) was an actual continuity of parenchyma, but more firm than the renal bodies. The under surface of the isthmus was concave, assuming a molded cast to the aorta. Surrounding the isthmus and separating it from the great vessels, was a very thin and delicate layer of areolar tissue devoid of cushion-like resiliency. Obviously pulsation of the aorta or pressure upon the intercommunicating mass of renal tissue from within or without might cause reflex symptoms.

To evaluate the symptoms of horseshoe kidney two definite entities must be considered: (1) The horseshoe kidney before gross changes to the renal pelvis have occurred; (2) horseshoe kidney after gross changes to the renal pelvis are manifest with subsequent pyelectasis, retention, infection and stone formation or tumor. In the former condition it must be understood that with abnormal development in utero, certain adjustments would of necessity occur until the child is able to comprehend. A reno-vascular reflex may cause a cyanotic appearance of varying degrees in the lower extremities. In childhood or adult life, the so-called horseshoe kidney syndrome may become manifest, namely: (1) reno-renal; (2) reno-gastro-intestinal. The reno-renal reflex pain of varying intensity in first one kidney and then in the other, may lead one to suppose calculus is present. On the other hand in the reno-gastro-intestinal reflex there may be pain of varying intensity, viz: in the epigastrium, right or left hypochondrium, iliac quadrants, loin or back. Such pain may be associated with nausea, fulness in the stomach, flatulence, constipation or other symptoms of indigestion. A sign described by Rovsing, though not pathognomonic, is the production of a characteristic pain in the epigastrium produced on bending the lumbar vertebra backward but disappearing on reclining. This condition is thought to be due to increased compression on the aorta and vena cava. The presence of or pressure upon the great abdominal vessels by the renal isthmus has been noted by some authors to have contributed to enlargement of the left heart, the result of circulatory interference.

In consequence of interference with drainage from the renal pelvis, an additional chain of symptoms of systemic and vesical origin may occur. As the renal pelvis dilates the ureteral attachment becomes elevated in consequence of tension on the most dependent part of the pelvis, thereby diminishing the pelvic outflow with subsequent retention and stasis, favorable to infection. Hydronephrosis secondary to a partial obstruction produces lumbar pain in diuresis, only to subside on restriction of fluid. This may account

for intermittent backache frequently seen in kidney cases. With the establishment of hydronephrosis, infection is a common sequence, with subsequent symptoms of chills, fever, leukocytosis and gastrointestinal dearrangement and, attendant with besical (cystitis) symptoms of frequency, pain and burning on urination. Tuberculosis, stone or tumor may occur as in normal organs, though none have been observed in my cases.

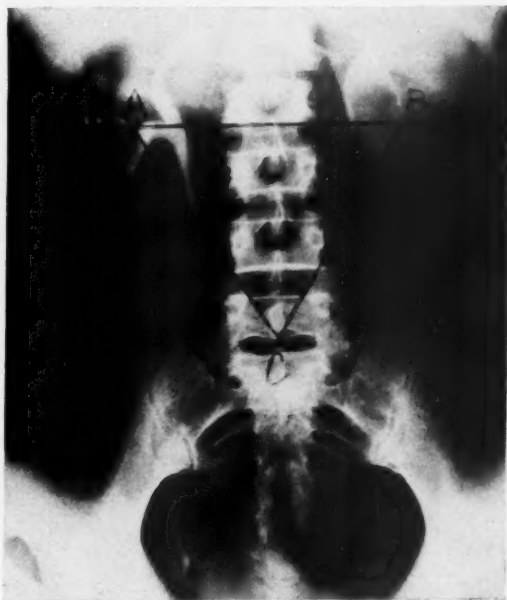


Fig. 1. Pyelographic triangle in a normal kidney. Note that the A and B angles are on a line with the inferior calyx.

It is hardly possible to diagnose horseshoe kidney from clinical symptoms and physical findings alone except in extremely thin subjects. A mass, which may or may not pulsate, may be palpable in the midline at a point where the isthmus crosses over, anterior to the great abdominal vessels. This would not likely be noted in the presence of infection to one or the other hemisphere because of an associated gastrointestinal reflex. In such a case the abdomen may be distended, with generalized tenderness, muscle guard or rigidity. Therefore, in obscure abdominal conditions not attendant with the complications associated with renal disease, in which a suspicion of chronic appendicitis, chronic gallbladder disease, gastritis, pancreatitis, or diverticulosis is not proved, a simple roentgenographic study should be made to rule out a horseshoe kidney.

The flat kidneys, ureter and bladder film may show interruption of the psoas muscle shadows on either side at the site of the isthmus or the lower pole of the kidney (which lie near the body of the vertebra) and is the result of overlying of this portion of the muscle. It might also be noted that the degree of renal motility is considerably less on respiratory effort, or reclining and standing films made of the urinary tract. This finding is brought about by the more or less fixation, the result of inadequate fatty tissue surrounding the isthmus where it passes over the abdominal vessels.

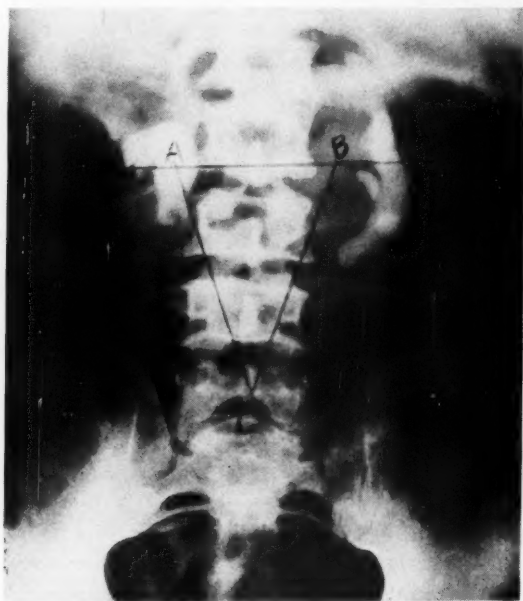


Fig. 2. Pyelographic triangle in a horseshoe kidney. Note the difference in degrees of the apical angle (c) as compared with in the normal pyelographic triangle Fig. 1.

Intravenous urography is a most valuable adjunct in so far as a positive diagnosis is concerned. The procedure is simple and attendant with a minimum of danger. It is usually carried out after proper attention has been paid to the elimination of gas and feces from the bowel and satisfactory dehydration (withholding fluids from 12 to 18 hours before examination). The film will show in most instances the presence of a so-called non-rotation of the renal pelvis with the infundibula and calices pointing backward and most usually the inferior calices pointing mesially toward the body of the ver-

tebra. Attention has been called to a pyelographic triangle by Guitierrez in which he shows the basal angle in the horseshoe kidney to average 20 degrees as compared to 90 degrees in the normal (it would seem that reference should be made to the apical angle



Fig. 3. The roentgenogram is that of a non-rotated variety of the kidney which may be easily mistaken for a horseshoe kidney. The pyelographic triangle in this case is about equal to that of a normal kidney.

rather than basal). A simple description of this apical angle of the pyelographic triangle is illustrated both in the normal kidney and in the horseshoe variety as follows:

A transverse line is drawn at the lower margin of the second lumbar vertebra which represents the basal line. The apex at the spinous process of the fifth lumbar vertebra designated as *c*. Lines drawn from *c* to *a* and *c* to *b* represent the pyelographic triangle. Angles *A* and *B* are formed at a point on a line parallel with the long axis of the vertebra and the cusps of the inferior calyx. In making these comparisons it will be noted that the apical angle *C* in the horseshoe kidney is considerably less than that observed in the normal kidney. Another quite diagnostic x-ray finding is the "vase" outline produced on the x-ray film by the presence of the ureteral catheters in place.

The management of horseshoe kidney with or without disease is dependent upon the gravity of the syndrome and the presence of concomitant disease. It must be considered as a surgical entity, since no lasting benefit is obtained from symptomatic measures. The



Fig. 4. Retrograde pyelogram of a horseshoe kidney with moderate hydronephrosis of the right, treated by catheter drainage and urinary antiseptics. Note the degrees in the pyelographic triangle, also the "vase" like appearance of the ureteral catheters in situ.

etiologic factors and the role of the anomaly predispose to infection, and concomitant disease needs be treated just as if we were dealing with disease in the normally developed kidney.

Before treatment is instituted in a given case the usual laboratory procedures should be carried out. The estimation of nitrogenous products in the blood, a blood count and urinalysis cannot be over-emphasized. Cystoscopic studies including ureteral catheterization; histologic and bacteriologic analysis of the urine and phenolsulfonephthalein estimation are valuable adjuncts and should be known. Any variations from normal should be compensated for before surgical treatment is undertaken. The anomalous kidney with pyelitis or pyelonephritis should receive the same consideration as the normal organ, namely: cell count and culture of the urine and suitable urinary antiseptic administered. However, in the recurrent in-

fection, care should be exercised in maintaining free drainage. This may be accomplished by such means as cystoscopy with ureteral catheterization and pelvic lavage; or with the use of indwelling ureteral catheter, in association with urinary antiseptics. This is to be

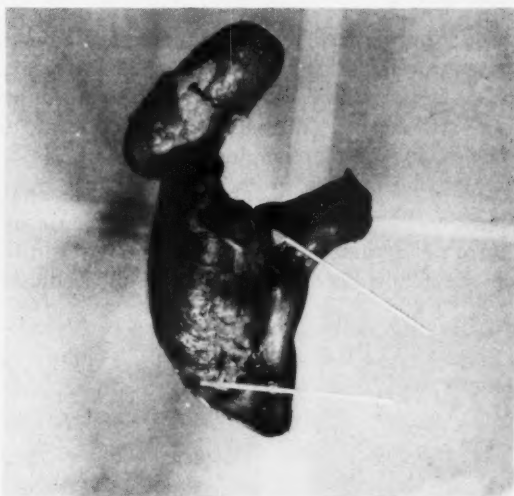


Fig. 5. Pathologic specimen (heminephrectomy). Marked hydronephrosis and hydroureter secondary to ureteral obstruction approximately 2 cm from ureteropelvic junction and also approximately 8 cm below the former. It will be noted that two main vessels entered the hilum of the kidney as indicated by applicator. No definite cause was found to account for the ureteral obstruction.

followed as soon as infection subsides by symphysiectomy with suspension and plastic repair, viz: pyeloplasty or ureteropyeloplasty in the case of hydronephrosis. Horseshoe kidney complicated with stone, either pelvic or ureteral, should be dealt with in the same manner as when dealing with stone in a normally developed kidney. Stricture of the ureter complicated with hydronephrosis, pyelonephritis or pyonephrosis require radical treatment if conservative measures fail to give relief; and tuberculosis or tumor would of necessity require heminephrectomy. Obviously the remaining half of the horseshoe kidney must have sufficient function to maintain life should the operation be carried out.

SUMMARY

1. The embryologic development and anatomic relationship of the renal pelvis and ureter of the horseshoe and non-rotating kidney is reviewed briefly.

2. An analysis of physiologico-pathologic factors in the production of concomitant pathology.

3. One cannot overemphasize the importance of intravenous urography in atypical gastrointestinal disorders before exploratory surgery is instituted.

4. The evaluation of the important positive diagnostic findings in the roentgenographic study, viz: (a) renal motility; (b) interruption of psoas muscle shadows; (c) "vase" outline produced by inlying ureteral catheters; (d) increased degree of basal angle (apical) of the pyelographic triangle.

5. The necessity for the establishment of good drainage through symphysiectomy with suspension and a plastic repair of the renal pelvis or uretero-pelvic junction. Heminephrectomy in those conditions in which one hemisphere is destroyed; in tuberculosis or tumor.

LATEX PROSTHESIS FOR COSMETIC RESTORATION OF THE AMPUTATED BREAST

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A PROSTHESIS is an artificial substitute for a missing part of the body. The art of making prosthetic devices is perhaps as old as the art of plastic surgery. Many materials have been utilized for the purpose, including metals, marble, porcelain, celluloid, vulcanite and papier maché. These materials are more or less hard, stiff and unyielding, are difficult to color, and difficult to keep fixed in position. In 1928 Lederer¹ presented a new method of prosthesis construction, utilizing gelatin as a base. This material added a new and desirable property to prosthesis construction, flexibility. This factor makes movement of the host possible without dislodgement of the artificial restoration. In addition, the prosthesis being soft, could be applied with adhesives, and the freedom of movement allowed permitted the dispensation of spectacle frames, springs, and surgically made shelves and receptacles for the appliances.

Since prevulcanized liquid latex rubber has become available, Bulbulian,² Peluse,³ and Brown,⁴ have described its use for prosthetic purposes. Most prostheses described up to now have been made to cover defects of the face and fingers. I shall describe a prosthesis for the restoration of the defect caused by the amputation of the breast and present pertinent notes on the technic of the construction.

With modern education, patients with breast diseases seek consultation earlier; breast carcinomas are seen and removed from younger individuals than in the past. For want of something better, persons who have undergone amputation of the breast attempt esthetic correction of the defect by wearing brassieres filled with several materials. Most commonly used fillers are cotton, upholsterer's hair or goose down. To wear them is difficult because the brassiere must be worn rather tightly to furnish a sense of firmness and security to the wearer. Perspiration is troublesome. Swimming, beach lounging and dancing become esthetically hazardous pastimes for these patients.

REPORT OF CASE

Mrs. M., aged 35, one year after the removal of the right breast on account of adenocarcinoma, sought improvement of contour because her former activities were curtailed. She had been fond of dancing and swimming but these activities were now almost impossible. She had attempted to wear a brassiere with down filling, but when it became soaked in swimming its shape was distorted, it became soggy and heavy, and the deformity became apparent. The fault was accentuated by congenital kyphoscoliosis toward the affected side. In

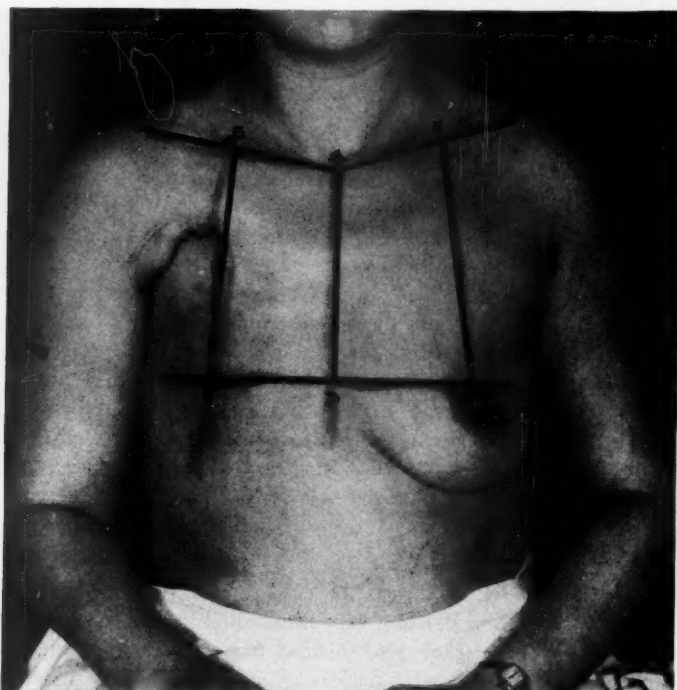


Fig. 1. Method for determination of ideal site for the nipple.

dancing, the patient was aware of the soft, krinkly, artificial feel of the brassiere, and during the normal contact of social dancing, the deformity was a source of unhappiness.

TECHNIC: The patient is placed in an upright position for measurements to determine the position of the artificial breast and the position of its nipple. As illustrated a line is drawn along the length of the clavicle from the angle of Louis to the acromium process. (A B) The measurements are made bilaterally. Another line (A D) is drawn vertically from the sternoclavicular notch to the xiphoid cartilage. With the arms dependent at the sides a line drawn from the acromium at the shoulder to the olecranon process at the elbow is measured and bisected. Upon each arm a mark is placed 1 cm. below this point. A line (C C') is drawn from this point on each arm, across the chest. The clavicular lines (A B, A B') are bisected (E) and a line is drawn from the midclavicular line (E) of the normal side to the nipple. Where this line crosses the line (C C') is the ideal location for the nipple. (E') A measurement is made of the distance from the midsternum to the point established as the

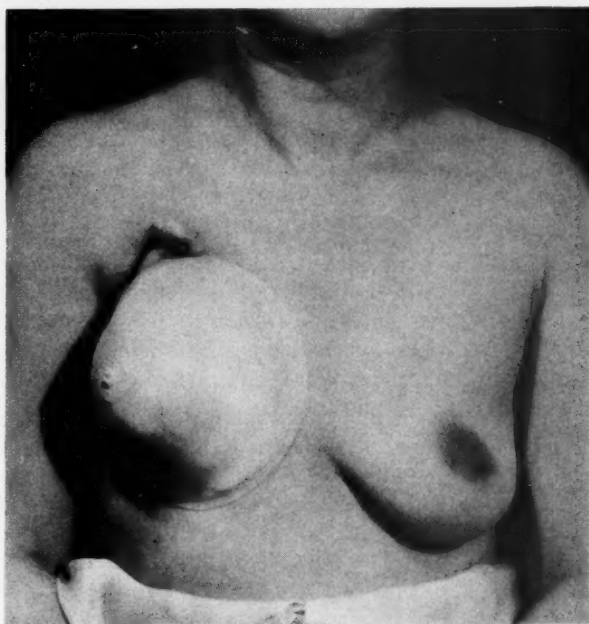


Fig. 2. The prosthesis in position. The patient's left breast will be elevated and suspended level with the prosthetic breast by the brassiere.

ideal nipple site on the normal side of the chest (D E'), and the same distance is measured on the operated side of the chest also along the line (C C') to establish the site for the artificial nipple. A small object such as a bead or button is glued to the skin, as a landmark. The patient is now ready for a negative impression to be made. Vaseline or mineral oil is very lightly applied to the side of the chest with the defect. The material for the negative impression may be ordinary molding plaster or one of the agar molding compounds. Ordinary number one molding plaster may be mixed with a small quantity of potato starch. This is mixed with water in a rubber mixing bowl and spread over the entire half of the chest. This mold should extend laterally as far as the midaxillary line and should include the shoulder and clavicle above. Thinner plaster furnishes finer detail. The patient is reassured that the hardening plaster becomes warm. The patient is cautioned to breath lightly to limit costal excursion. The hardened plaster is removed and painted with a thin coat of vaseline or dental separating compound.

To make a positive reproduction of the chest various plasters are useful. Hydrocol, hard dental stone, hard molding plaster or rapid dental laboratory stone are all satisfactory. The plaster is

made into creamy paste by mixing with water in a rubber bowl and spread thickly over the negative mold. The negative is gently tapped to remove bubbles. It is then allowed to dry. The positive mold is removed from the negative impression by immersing both into hot water and separating them with a stout knife. The potato starch in the negative mass tends to swell in the hot water and forces the negative mold to disintegrate. The positive is gently cleaned and is ready for the sculpture of the new breast.

Prostheses are modeled with various materials. Some use dental wax. For a part as large as the breast modeling clay is more convenient and inexpensive. The model, however, must be kept damp during the entire process of modeling. Plasticine made with fine clay and olive oil is excellent and need not be kept damp.

During the pouring of the positive impression the imbedded bead or button serves as a guide to locate the position of the nipple of the sculptured model. A tooth pick or applicator inserted at this point serves as a land mark. In modeling the breast it is made very slightly larger in all dimensions to allow for a small amount of shrinkage in the rubber. The borders of the modeled breast should be smoothed to a feather-edge. Once the prosthesis is modeled satisfactorily as to size, position and artistic fidelity it is ready to have the pores of the skin reproduced, as well as the details of the nipple.

In modeling a new breast not only is the breast duplicated but extra mass must be provided on its lateral aspect to compensate for the loss of the pectoral muscles which have been removed surgically. If the operative scar extends to the axilla much of the scar and consequent axilla distortion can be covered by an extension of the prosthesis.

Most individuals use brassieres to support the unoperated breast. The restoration on the operated side is modeled not to a more or less pendulous outline of the remaining breast but with its contour idealized and its nipple at its ideal artistic site. Thus when the brassiere is worn it serves to keep the restored breast in its position, as made, and serves to lift the unoperated breast to its normal position.

To reproduce the pores of the skin a small fresh mixture of plaster is poured over the skin of the remaining breast, dabbing it over a two or three cm. area. As it hardens a wooden applicator is inserted into it to serve as a handle. When hard it is removed and is used as a tampon or impressor to gently stamp the pores and delicate skin tracery into the clay model.

The nipple may be reproduced in much the same way from the normal nipple. The erectile muscles are stimulated with cold water,

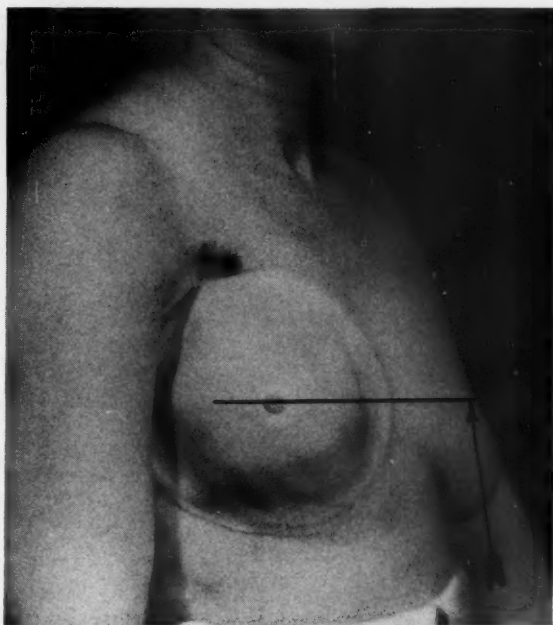


Fig. 3. Oblique view of prosthesis in position. Arrow indicates level to which normal nipple will be elevated.

fast setting hard plaster is poured over the erect nipple and after hardening is removed. If this negative impression presents undercuts they are gently shaved away. This negative impression is pressed upon the roughly modeled nipple and reproduces the pores with astonishing fidelity. In completing the mold, key openings are excavated in two or three places near the edge of the positive mold to insure accurate fit of the positive mold later. It is lightly coated with vaseline, avoiding the sculptured area. This positive plaster mold will later become the bottom portion of a two piece mold. The positive cast bearing the sculptured breast is then covered with hard plaster. The parts of the mold are carefully pried apart and the clay washed out.

Construction of a passage for the poured rubber is then made. It is a conical opening drilled through the bottom half of the mold. It should be about $\frac{3}{8}$ of an inch in diameter at the narrow end and two or three inches in diameter at the mouth. It is dug into the bottom part of the mold so that its approach is from the posterior or hidden side of the restoration. The mold is now thoroughly dried because the air content of the plaster is depended upon to cure the rubber.

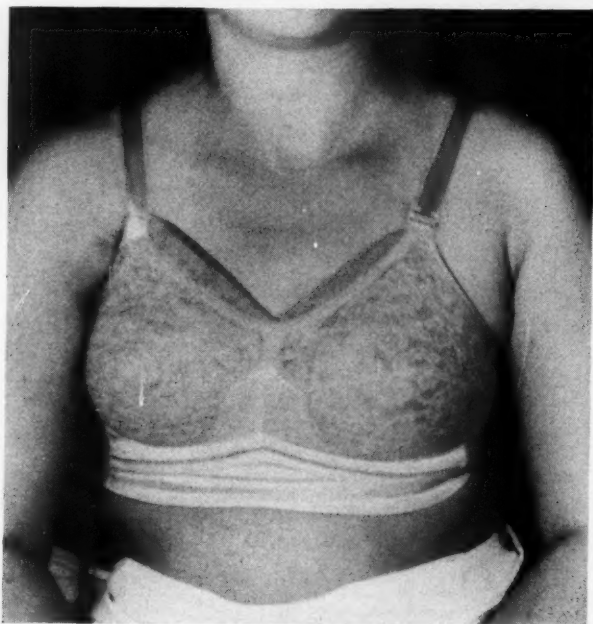


Fig. 4. With brassiere.

The type of rubber to cast with is important. For this larger prosthesis we use a thick type of latex in which shrinkage is negligible and the product quite firm. It may be thinned with 28 per cent ammonium solution. Color is a vitally important factor in the achievement of a good prosthesis. Color added to the surface of a restoration only contributes to an artificial appearance. Color mixed with the latex before pouring gives the restoration an appearance closest to a natural skin, with a normal skin-like translucence. The colors used must be alkaline fast. Congo red, Biebrich scarlet, #3, and carmine red are suitable red dyes. Burnt umber and iron oxide are satisfactory browns. Cadmium yellow and Bismark brown are also passable dyes.

Two paste colors which are stable in the presence of the ammonia diluent of the rubber are Red CD paste* and Orange YOD paste.* The paste colors are made up of about 25 per cent active color and 75 per cent water and contain dispersing agents. We dilute the paste with a little ammoniated distilled water, to obtain more delicate tints. If color agglomerates or specks show up on the finished latex prosthesis one may assume that the colors did not

*DuPont du Nemours Co., Wilmington, Del.

disperse easily because they were not compatible with ammonia. This we have found is the most common reason for flocculation.

The mold is filled with rubber and it is set aside for about 45 minutes, when the excess rubber is poured out. A layer of rubber will remain coagulated against the plaster of paris jacket. It should be about $\frac{3}{8}$ of an inch thick. If it is not thick enough the liquid latex may be poured into the mold a second time, to add to its thickness. When thick enough it is placed in an oven at about 150 degrees F. for about 24 hours. If an oven is unavailable it may be left at room temperature for one or two days.

After a day or two of drying the mold is opened and the restoration is inspected for bubbles, color and shrinkage. If the color is not right an alteration of color is made and a new pouring is necessary. Liquid latex is self vulcanized. It is coagulated upon exposure to air. Thus plaster of paris permits the air to reach the rubber through the pores of the plaster.

The edges of the prosthesis are trimmed with a fine scissors and an electric burning pencil. This is a stylus with interchangeable points of various shapes. Seam lines may be obliterated with the heated knife edge and irritating points on the skin side of the prosthesis may be trimmed away with it.

The prosthesis is hollow and a few pinches of lycopodium are sprinkled or blown into its interior to prevent adhesions within the cavity. The openings through which the rubber was poured are sealed with a thin sheet of latex. Thus the prosthesis is pneumatically sealed and the imprisoned air together with the natural elasticity of the latex rubber compound lends a resiliency to the restored breast comfortable to the wearer and esthetically satisfactory to an astonishing degree.

The prosthetic breast restoration may be held in place with a brassiere, or for such occupations as swimming or when a brassiere cannot be worn it may be attached with a mucilage made of styrax, gum mastic and chloroform. We have found it non-irritating and quite convenient to use. It retains the prosthesis firmly and seems perspiration and water proof.

SUMMARY

1. A latex compound prosthetic device to restore the contour after breast amputation is described.
2. It is pneumatic, elastic, soft and resilient.
3. The cosmetic effect is good.

4. The technic of construction is described.

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THE MANAGEMENT OF THE POSTOPERATIVE RETENTION OF URINE

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THE proper care of the urinary bladder during the first few postoperative days is a common problem in general surgical practice. In its solution two divergent schools of thought have developed, the first teaching that catheterization is always interdicted, and the second contending that catheterization is harmless. If the first plan is followed—that is, if the patient is not catheterized—urinary infection possibly may be avoided. Many patients will eventually void unless there is some obstructive lesion or neurogenic factor but the severe pain attending vesical overdistention seems unnecessary in the light of our present knowledge.

The development of urinary retention following an operation is dependent upon several factors. As a rule if the operative site is near the bladder, the incidence of postoperative retention is somewhat higher than if the operation is in a more remote region of the body. In gynecologic operations trauma of the bladder musculature and nerve supply may cause diminished detrusor tone and lessened sensibility of the bladder to distention resulting in urinary retention, resembling the neurogenic bladder in many respects. Under these circumstances the bladder distends easily without great discomfort. However, in operations far removed from the bladder, there may be so-called reflex retention due to inhibition of the nervous control. Anesthesia, either general or regional, may induce a temporary inability to micturate. Other possible factors are the use of analgesics, narcotics, and also posture, and decreased intra-abdominal pressure. Neurologic operations, especially those involving the spinal cord, may produce a temporary or prolonged disturbance of bladder function. Post-partum retention seems to be related to fatigue, as it is more often observed when labor is unduly prolonged.

The normal bladder may possess inherent immunity to infection; but this is not true of a bladder which has been subjected to trauma, either physical or chemical. However, in any operation in which the bladder is normal, it is desirable that the normal state be preserved; this objective is attained largely by the avoidance of overdistention, as well as the most gentle surgical technic. Overdistention predisposes to vesical atony and residual urine. The latter is fertile soil for infection and if urinary stasis is not recognized and adequate

drainage maintained, infection will occur in many cases. It may be stated that the avoidance of infection is synonymous with the avoidance of overdistention. Careful supervision is required during the immediate postoperative period in order that catheterization may be employed, not after distention has occurred, but before it has occurred. The normal bladder capacity usually does not exceed 500 c.c. and the surgeon should not permit distention beyond this amount. While recovering from the anesthetic the patient may not be conscious of the desire to empty the bladder and overdistention may occur if this possibility is not anticipated. Orders should be given by the surgeon to catheterize the patient after a limited period which we have arbitrarily placed at eight hours. Sometimes valuable time is lost in an effort to avoid catheterization by carrying out psychic and physical stimulation such as the pouring of liquids from one vessel to another or the application of mild irritants to the urethral meatus, etc.; such measures are without value as a rule during the immediate postoperative period. It has been ascertained that overdistention of the bladder predisposes to inefficient vesical function evidenced by the presence of residual urine after the act of micturition has been resumed. It is not uncommon to find 500 to 1000 c.c. of residual urine after the patient has voided 300 to 500 c.c. It is highly important that the amount of residual urine be checked daily and the bladder drained completely by catheter at least every twenty-four hours, until none is found, as in so doing, the fundamental cause of infection of the bladder and so-called postoperative cystitis is avoided. If these measures are not employed, urinary infection of an intractable type may be a late and distressing sequel. In our experience, the judicious use of a catheter has been the means of preventing postoperative urinary infection whereas the avoidance of catheterization means failure to recognize the presence of residual urine and infection. Needless to state, the strictest aseptic and antiseptic precautions are carried out in the use of the catheter and a small amount of a mild antiseptic such as neutral acriflavine solution (1:5000) is left in the bladder. The frequency of the use of the catheter is varied somewhat depending upon the fluid intake and urinary output. In the average case it has been found that catheterization every eight hours is sufficient to prevent vesical overdistention. In women a glass catheter of small caliber is easily inserted and with less trauma. In men a rubber catheter not over 14 to 16 F. in caliber can be inserted with very little discomfort and a minimum of trauma.

In cases in which catheterization may be necessary over prolonged periods of time, as in instances when the patient is unconscious or delirious, it is a better plan to employ an inlying catheter and con-

stant drainage. The small size Foley catheter (16 F.) is ideal for this purpose. In women it is far superior to the mushroom type of inlying catheter as it can be inserted and withdrawn without trauma. The bag near the tip is distended with 5 c.c. of sterile fluid which transforms it into a self-retaining catheter. In men this type of catheter obviates the necessity of adhesive strapping, etc., and furthermore the tip is maintained in its proper position slightly above the vesical neck.

In using a retention catheter, an ideal arrangement for vesical lavage is to connect an irrigator containing sterile fluid by including a T tube in the tubing leading to the receptacle at the bedside. Obviously this is clamped off except when irrigations are administered. Its advantage lies in the fact that a closed system of drainage is provided which minimizes the possibility of introducing infection such as might occur if the catheter is disconnected and a hand syringe employed.

In these cases the oral administration of some efficient urinary antiseptic also is desirable. The sulfonamides are ideal for this purpose with special reference to sulfathiazole, sulfadiazine, and sulfanilamide. These have been found effective especially in the common types of bacillary infections, not only in their eradication, but as a prophylactic. Masson and Wilson recently reported that the administration of one gram of sulfanilamide per day throughout the postoperative course protected patients from urinary infection; three doses of 0.3 grams each daily by mouth, or it may be administered subcutaneously as a solution containing 0.81 grams per liter. These small doses seem to act more as a bacteriostatic. If there is a well established infection, larger doses are necessary. In a group of one hundred fifteen patients who had urinary retention with intermittent catheterization or inlying catheters, these observers noted an incidence of urinary infection in only 25 per cent when this type of prophylactic treatment was employed. In a control group receiving no treatment, 72.5 per cent developed evidence of urinary infection.

SUMMARY

1. Postoperative urinary infection is largely preventable if overdistention of the bladder is not permitted.
2. Catheterization approximately every eight hours will prevent vesical overdistention in most cases.
3. Upon the resumption of the act of micturition, it is important to test for residual urine as the vesical function may be inefficient.
4. If residual urine is found, it should be drained completely by

catheter at least once daily until none is found on two or three consecutive tests.

5. In cases requiring prolonged periods of catheterization, a small inlying catheter of the Foley type is preferable to intermittent catheterization.

6. The employment of the sulfonamides, preferably sulfathiazole or sulfadiazine, as a prophylactic immediately before and during the postoperative period will reduce the incidence of urinary infections to a minimum, especially if urinary stasis has been prevented.

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PHEOCHROMOCYTOMA: OPERATIVE FAILURE

Case Report

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THE patient, a male aged 32, was admitted to Emory University Hospital on April 23, 1941. He was referred by Dr. Edgar Fincher for study concerning hypertension. The onset of the present illness began six or seven years prior to this admission. The patient described attacks characterized by severe headaches for fifteen or twenty minutes duration, and dizziness, shortness of breath, pounding of his heart, substernal pain, nausea, vomiting and sweating. The latter symptoms would persist for one to two hours. These attacks occurred in the morning shortly after arising and by afternoon the patient felt well and normal. In April, 1937, the attacks became slightly more severe but the patient was able to continue work to April 1, 1941. On this day the patient had the usual attack which had apparently subsided. At about 10 o'clock on this morning he started with jerking of the middle and ring finger of the right hand. This was followed immediately by jerking of the entire body and loss of consciousness and frothing at the mouth. He was told there was marked rigidity of the entire body. Unconsciousness persisted for nearly two hours and on regaining consciousness there was severe headache and generalized weakness associated with motor disturbance in the right arm and leg. He was admitted to a hospital in a state of unconsciousness and his blood pressure was found to be 240 at that time.

Two years prior to this admission the patient was found to have a blood pressure of 230. Sugar was also found in the urine. Insulin was used for a short time but it was said to have caused the blood pressure to rise still higher so it was discontinued.

The patient was examined on April 14, 1941 by Dr. Fincher. This was two weeks after the convulsive seizure. At the time of this examination the patient's pulse rate was increased. There were old punctate hemorrhages in the retina. It was noted that the patient had a fluctuating hypertension. It was Dr. Fincher's opinion that the patient had had a subarachnoid hemorrhage. He admitted the patient to the hospital for a study of the peculiar fluctuating type of hypertension.

Read before the Atlanta Clinical Society, Jan. 28, 1942.

From the Departments of Medicine and Surgery, Emory University School of Medicine, Atlanta.

The general physical examination revealed a well developed and nourished male. At the time of admission the patient was not in one of the attacks described above. At this time, examination of the head was negative. The eyes were normal except for a slight suggestion of exophthalmus. The nose and mouth were negative. Examination of the neck and thorax were negative. The lungs were clear and resonant. Examination of the heart revealed slight enlargement in the region of the left ventricle. There was a systolic blow over the entire precordium of moderate intensity but heard best over the pulmonic area. The abdominal examination was negative. Examination of the extremities, glands, skin, genitals and rectum revealed no positive results. The reflexes were slightly increased on the left side. However, there was no clonus and no Babinski.

Routine examination of the urine revealed 0 to 2+ albumin, 0 to 3 red blood cells and positive sugar. Routine examination of the blood revealed 5,336,000 red blood cells with 98 per cent hemoglobin. There were 10,900 white blood cells with 4 per cent bands, 67 per cent segmenters, 5 per cent eosinophils, 20 per cent lymphocytes and 4 per cent monocytes. Routine stool and Kahn were negative. Special studies revealed a renal concentration maximum of 1.036. This figure was corrected for albumin, sugar and temperature. A smear of the urine sediment and culture of the urine were negative. A basal metabolism taken May 24, 1941 was +74 and a repeat taken on May 28, 1941 was +41. The glucose tolerance test revealed a fasting blood sugar of 283 mg. per cent with a 1+ urine sugar. At the end of one-half hour the blood sugar was 326 mg. per cent with a urine sugar of 2+ and at the end of one hour the blood sugar was 380 mg. per cent with a 3+ urine sugar. Blood cholesterol 287 mg. per cent. Non-protein nitrogen 36 mg. per cent. Creatinin 1.4 mg. per cent.

An electrocardiogram revealed a short PR interval. The R wave was tall in all leads and slurred in lead 3. The T wave was low in all leads and there was a moderately deep S in lead 1. An x-ray of the chest revealed mild pulmonary congestion. The greatest transverse diameter of the heart was 13.5 cm. and the greatest diameter of the thorax was 31 cm. The aortic arch measured 5 cm. Moderate left ventricular hypertrophy was noted.

A tentative diagnosis of pheochromocytoma was made and the patient was then seen by Dr. M. K. Bailey for retrograde pyelograms. Studies of the left side were normal. Pyelogram on the right revealed the pelvis to be slightly dilated, the minor calyces were blunted and there was slight displacement of the kidney inferiorly (fig. 1).

While these studies were being completed we had the opportunity of observing the patient on many occasions during an attack. On awakening in the morning at 6 a. m. the blood pressure was usually 130 systolic over 85 diastolic (chart 1). After beginning the routine of the hospital in the morning, his blood pressure would



LEFT

RIGHT

Fig. 1.—Retrograde pyelograms showing deformity of right kidney pelvis and calices.

gradually rise. On one occasion the systolic pressure was over 330: we did not determine the highest elevation of pressure because we did not have a manometer which reached such a level. The diastolic pressure was 150 at that time. As the blood pressure would rise the patient would complain of severe headache, dizziness, substernal pain, shortness of breath, nausea and pounding of the heart. In addition to these symptoms a slight increase in exophthalmus was noted and the patient developed a heliotrope cyanosis, affecting especially the face, hands and feet. The cyanosis would alternate

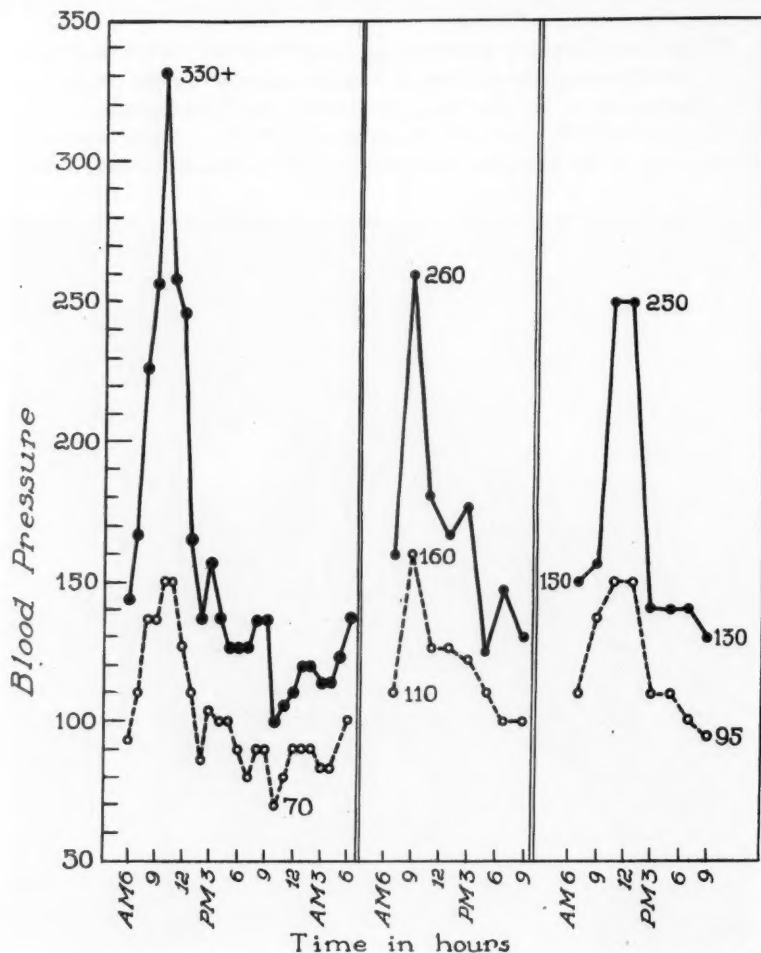


CHART 1. Typical paroxysms of hypertension.

with pallor and this was particularly noted as circumoral pallor. Diaphoresis was profuse. The respiratory rate during these attacks averaged about 28 per minute and the pulse rate about 80. By 10 or 11 o'clock in the morning the patient was usually quieting down from all of these symptoms and by about 10:30 the blood pressure would begin to fall. By 4 o'clock in the afternoon the blood pressure would reach a level of 130 to 140 over 70 to 90 and would remain at this level until the following morning. During the course of one of these attacks a blood potassium was determined and found to be elevated. Wells¹ and his coworkers have noted a rise in blood potassium during attacks of release of epinephrine in

these patients. Elevations as high as 86 per cent above normal have been noted on the injection of epinephrine. These same workers have also noted the increase in blood sugar and pointed out that there may be changes in the blood count. Following this lead, a white blood count was made throughout one of the attacks. The

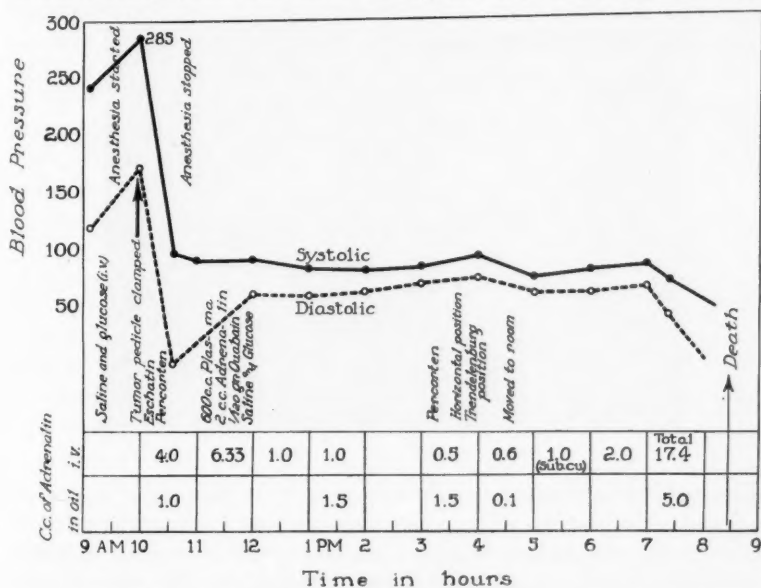


CHART 2. Blood pressure and medication from operation to death.

lowest white blood count during an attack was found to be 24,550 white cells and the highest count was 52,000. The differential count usually revealed an increase in the segmenters at the expense of the lymphocytes and there was always a slight increase in the bands. The average total segmenters was 94 per cent and the average percentage of bands was 9 per cent. These figures were derived from thirteen determinations.

With the above facts in mind it was our impression that the patient had a pheochromocytoma of the right adrenal body. He was, therefore, operated upon by Dr. M. K. Bailey on the morning of June 14, 1941 (chart 2). A high loin incision was made and the twelfth rib removed.

Because of the known profound shock suffered by these patients with any minor or major surgical procedure and because of certain physiologic disturbances which may take place, the patient was prepared by the injection of natural and synthetic hormones from the adrenal body beginning three days before the operation. In addi-

tion, he was given large quantities of salt in his liquids. During the course of the operation the patient received 600 c.c. of plasma and large quantities of saline and glucose. He also received the natural and synthetic hormones from the adrenal body and numerous injections of adrenalin in oil subcutaneously. Full doses of ouabain

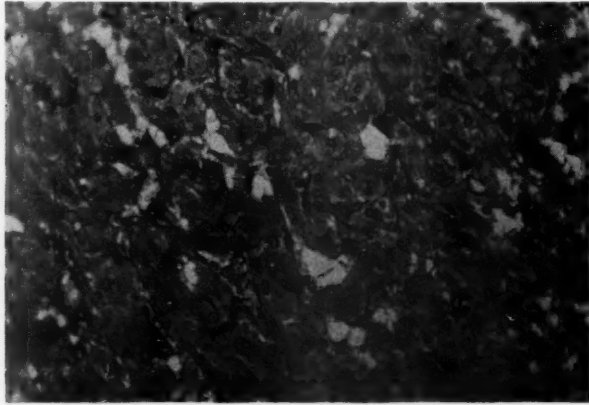


Fig. 2.—Photomicrograph of the pheochromocytoma.

were used in the emergency which followed. Immediately on clamping the pedicle of the tumor which was located in the right adrenal body the blood pressure fell precipitately to 95 over zero. Further drop may have occurred except that the patient was immediately started on intravenous epinephrine and between 10:40 in the morning after clamping of the pedicle, and 8:25 in the evening at which time the patient died, he had received a total of 17.4 c.c. of 1:1000 epinephrine intravenously and 5 c.c. of adrenalin in oil subcutaneously. Even with these huge quantities the blood pressure never was above 100 systolic. After starting the epinephrine intravenously the systolic pressure never went above 90. The diastolic pressure rose to 60 and ranged between 40 and 75 until death. Death occurred 8½ hours after the operation was completed and seemed to be shock and respiratory failure. Respiration stopped 15 minutes before the heart stopped beating. Shortly after the anesthesia, which was ether, was started the patient began with a very rapid and extremely deep ventilating type of respiration. The average respiratory rate after starting anesthesia and until death was about 50 per minute. Just before, during and after the operation the pulse rate was quite rapid and exhibited all of the clinical characteristics necessary to diagnose bigeminy, trigeminy, auricular fibrillation and sinus tachycardia. The average pulse rate from the time of beginning of operation until death was 150 to 160.

Biskind, Meyer and Beadner² in February 1941 summarized all cases of this nature which have been attacked surgically in an effort to cure the condition. Twenty-nine cases were reported with six deaths. Three cases were omitted from this series. One because the preparation of the patient produced such a severe paroxysm that intervention was not attempted and the patient died two days later. The second case was explored but the tumor-bearing gland was left in situ. The patient died the next day. In the third patient exploration of the right adrenal gland produced such a severe paroxysm that it was followed by collapse and death. Since this time there has been one further case report of surgical removal with cure and this case of surgical attack and failure.

Pathologic report of the tumor by Dr. R. R. Kracke revealed an egg-shaped, perfectly encapsulated mass measuring 9 by 5 cm. Total weight was 146 Gm. A small piece of cortical adrenal tissue was found attached measuring less than 1 cm. Grossly the cut section shows an outer rim of tissue varying from 1.5 to 3 cm. thick. The cells appeared to be arranged radially in this layer. The core of the tumor was fairly firm, grayish white and somewhat translucent in appearance. The outer rim was yellowish-orange in color.

The microscopic section showed the tissue to consist entirely of masses and parallel rows of epithelial like cells which vary considerably in size in both cells and nuclei. There was a palisading tendency in the histologic structure. The cells were rather large with round to oval vesicular nuclei occurring in parallel arrangement indicating neurologic features and there were scattered cells that contain a considerable amount of pigment. The tissue was extremely vascular, showing numerous blood vessels of varying size with the lumens packed with red cells and there was a considerable extravasation of red blood cells between the cords of tumor cells. The tissue took the chromate stain (fig. 2).

Dr. George Lewis of the Department of Biochemistry was able to demonstrate that the tumor contained 9.7 mg. of epinephrine per gram of tissue.

No attempt has been made to summarize the literature concerning pheochromocytoma. This report merely represents a case of rare appearance and one which frequently may be cured by surgery when otherwise they are sure to die.

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RETROPERITONEAL TUMORS

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THE retroperitoneal space lies between the peritoneum and the posterior parietal wall of the abdominal cavity. It is divided into lumbar and iliac fossas, extends upward to the twelfth rib and dorsal vertebra and downward to the base of the sacrum and iliac crest. The lateral borders are roughly the margins of the quadratus lumborum muscles. The space is filled with fatty areolar tissue through which pass the ureter, renal vessels, spermatic and ovarian vessels. The iliac lymph glands are profusely scattered throughout the iliac fossa. A well defined chain extends from the inguinal ligament to the diaphragm. Many glands and nodes are grouped around the trunks of the great blood vessels of that region. This constitutes a part of a direct lymphatic system of drainage between the extremities, pelvis, abdomen, and the mediastinum.

Tumors found in the retroperitoneal space are: (1) cystic, (2) solid, in the ratio of two to one in favor of the cystic tumors. They are relatively rare compared to neoplasms in other fields of the body. Peterson collected only about 300 cases which had been recorded, 186 of which were solid tumors.

TYPES—

I. Cysts

- a—Dermoid
- b—From Wolffian body
- c—From Mullerian duct
- d—From intestinal origin, Meckel's diverticulum when it shows an intramesenteric position.

II. Solid tumors

1. Benign.—Usually grow large and push their way forward between leaves of the mesentery; are less firmly attached to the surrounding tissue; less vascular and are removed with greater facility and less shock to the patient.
2. Malignant.
 - a—Liposarcoma
 - b—Myosarcoma
 - c—Fibrosarcoma
 - d—Neurosarcoma
 - e—Lymphosarcoma
 - f—Hodgkin's disease
 - g—Brill-Symmers disease

Malignant tumors are usually smaller in size, grow firmly by infiltrating into surrounding tissue, are vascular and difficult to re-

move, and too, the operative procedure is attended with varying degrees of shock.

It is of interest to note that of the cases reported, the order of occurrence is:

1. Lipoma
2. Fibrolipoma
3. Fibrosarcoma
4. Lymphosarcoma

The general group of symptoms noted in all of these tumors is that of inconvenience, discomfort, and pressure, incident to size. As a rule they are painless because their growth is insidious and contiguous structures and functions accommodate themselves accordingly in the slow evolution of the pathologic process.

In the cystic type, infection may invade the mass and acute inflammatory symptoms present themselves, simulating twisted ovarian pedicle with agonizing pain, leukocytosis, temperature, sweat, and shock. When the tumor is high, pressure on the kidney refers pain characteristic of Dietl's crisis. Usually the patient or members of the family will notice, as the first symptom, a painless enlargement of the abdomen. Blood examination will often show anemia if the growth is malignant and soon cachexia will be observed. This will not be evident in benign tumors, but on account of the larger and more rapid growth, the benign type will give pressure symptoms and visible outline to corroborate the diagnosis.

Lymphosarcoma of the retroperitoneal glands is the most frequent of the malignant growths found in this space. It is often confused with Hodgkin's disease but may be differentiated in a short while by the appearance of glandular enlargement in other parts of the body, the blood picture, etc.

In lymphosarcoma the growth enlarges rapidly and progressively. Lymphosarcoma causes more pain because the gland capsule fuses with nodes and tissues of adjacent structures with resulting tension on the nerves of the tissues invaded. The gastrointestinal tract, the pleura and the peritoneum, are frequently invaded by metastases while this is not true in Hodgkin's disease. Because Hodgkin's disease is often referred to as a form of lymphosarcoma and because also it frequently begins in the retroperitoneal glands, a few points of differential diagnosis should be observed. First, in Hodgkin's disease multiple glandular enlargement is the rule. The excision and examination of the gland with frequent examinations of the blood, confirms or contradicts the diagnosis. The histology of Hodgkin's is typical and constant; the blood picture is fairly characteristic; leukocytosis is usually present, and it may be so

marked as to suggest leukemia; the excess is usually of polynuclear cells, occasionally of lymphocytes. Atypical cells found in the tumor are often found in the blood, serving further to confuse the distinction between lymphosarcoma and leukemia. The symptoms, pruritus, diarrhea, and recurrent type of fever, are also suggestive of Hodgkin's disease as a valuable differential symptom.

Retroperitoneal cysts of the kidneys, adrenals, and occasionally from the pancreas, should be considered in connection with the organs from which they arise. In either a cystic or solid type of tumor resting high, displacing the stomach and intestines, constitutes a valuable point to be considered. If the colon is inflated, when not already filled with gas, it will be observed that the colon lies in front of the tumor and is surrounded by an area of resonance which argues in favor of retroperitoneal tumor.

Retroperitoneal lipomas may arise in connection with tumors of the kidneys, adrenals, or pancreas. It is extremely doubtful if any tumor in this area should masquerade under such an innocent name and yet I am reporting one such tumor below in which repeated search, with numerous sections studied by a competent pathologist, failed to show any other than fatty tissue.

Boyd states that myxomatous and sarcomatous areas are often found hidden away in some remote section of the tumor which is predominantly fat. He stresses repeated examination in all sections of the tumor because many of these growths are allied to the teratomas rather than to the innocent lipomas.

Lipomas are seen mostly in middle life; they are more common in women than men; they commence as a rule on either side of the vertebral column about the level of the kidneys. They grow slowly and may reach an enormous size, the abdomen remaining large while the rest of the body shows marked emaciation.

Hansmann and Budd some years ago reported seventeen retroperitoneal tumors that were not attached to the urogenital organs, yet all showed similar characteristics of urogenital development. Their conclusions were that a majority of retroperitoneal tumors arise from remnants of the embryonic urogenital apparatus during further development. Retroperitoneal appendix, while rare, is to be dealt with and many times taxes the surgeon when he has difficulty in finding or delivering the appendix. I have had four such cases in which the appendix immediately after its origin from the ileocecal junction penetrated the posterior sheath of the peritoneum.

Busher made a collection of 200 cases brought to autopsy and found the appendix retrocecal in 30 per cent of the cases and 7 per cent of these were retroperitoneal.

Strauss collected 1651 autopsies in which 22 appendices were retroperitoneal. Small, in 1928, reported 7 cases seen in his own practice with 6 successful operations and one death.

The symptoms noted in my cases were somewhat misleading in as much as they gave urinary characteristics. One case in point was

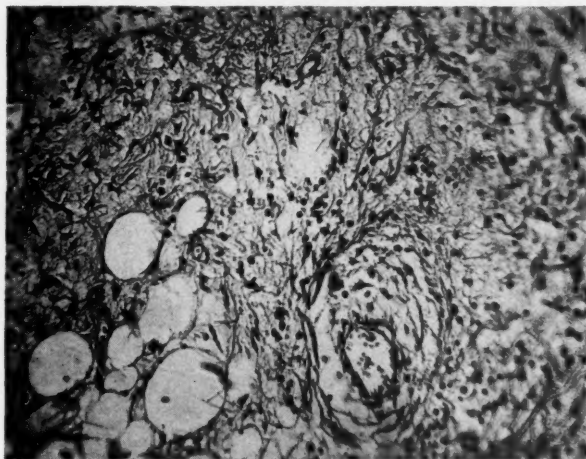


Fig. 1. Fibrolipoma. Section of fibrolipoma shows fatty tissue and loose connective tissue with moderate infiltration of connective tissue cells.

One small blood vessel is shown.

that of a man, 42 years of age, who had suffered with pain in the right lumbar region for five years. He always had pain in the epigastrium, tenderness, temperature, nausea, and leukocytosis. He showed maximum tenderness in the back, spasm of psoas muscle, pus and blood cells in the urine. Each previous attack had always been relieved by ureteral dilatations done by an excellent urologist. X-ray examination with retrograde urogram showed a narrowing of the lumen of the right ureter just opposite to the crest of the ilium. After repeated efforts to relieve his symptoms, I saw him in consultation and it was decided to operate for atypical appendicitis. Incision was made obliquely in order to explore the retroperitoneal ureter if the appendix should prove to be innocent.

The appendix was observed at its base after rotating the cecum but it showed dense fixation and inflammation. Following through the posterior layer of peritoneum, a large stone, the size of an average olive, was found at the end of the appendix, around which was a definite abscess, the walls of which were infiltrated and thickened and contained approximately one ounce of thick pus sur-

rounding the stone. This mass was pressing directly against the ureter and was responsible, no doubt, for the partial occlusion of the ureter shown in the urogram. Strange enough, there was no evidence of stone in his x-ray studies.

The appendix was removed from the cecum and pushed through the posterior layer, the incision extended to permit retroperitoneal removal of the stone, and appendix. A drainage tube was placed in the abscess cavity and brought out through the back. The patient made an uneventful recovery, his gastrointestinal and urologic symptoms cleared up and subsequent x-ray studies showed no occlusion of the ureter.

When only a bulbous type of appendix is seen in the retroperitoneal position, I prefer to do a subperitoneal enucleation just as I prefer in retrocolic appendices.

Another interesting tumor of the suprarenal gland I shall mention, in as much as the typical changes were present. This woman, in the climacteric at 44, the mother of six children, had been sick for one year with a gradual loss of weight. She had noticed bronzing or pigmentation of the skin, soon followed by hirsutism over the entire body and extremities, with atrophy to almost disappearance of the mammary glands. The voice had changed to a heavy masculine type; there had been no change in the external genitals. Clinical presentation was that of a large, firm, mass in the left dorso-lumbar area presenting well to the front. Blood and kidney examination essentially normal, a diagnosis of adrenal tumor was made. Removal was effected through a lumbodorsal incision with considerable hemorrhage due to liberation of dense adhesions. The patient survived the operation but she died a few days later of pulmonary embolism.

The tumor weighed 4,200 Gm. Grossly it was rather large and soft, containing multilocular cysts. The color was bronze or renal in character with irregular borders but no suggestion of a capsule.

Because of the signs of masculinization, arrhenoblastoma, or arrhenoma as Ewing prefers to call it, was considered in the differential diagnosis. Since arrhenoma arises from ovarian tissue primarily before metastasizing even to retroperitoneal glands, this tumor, I believe, can hardly qualify as an arrhenoma: rather, I consider, it owed its histogenesis to the cortical portion of the adrenal gland (fig. 2). Ewing does state however, that in these masculinizing tumors of atypical symptomatology that the diagnosis becomes an arbitrary decision on the part of the observer.

Ewing states that the usual course of adrenal tumors shows diffuse metastasis, rapidly penetrating surrounding tissues, creating

bulky metastatic masses; it is progressive and is practically always fatal. Any persistent pain in the back, not explained by other processes, slowly developing asthenia and cachexia, with muscle resistance over the area of the pain, should be placed in a category suggestive of adrenal tumor until definite diagnosis can be made.

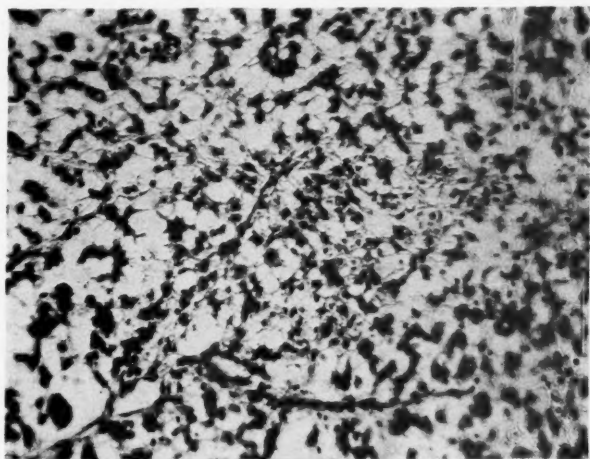


Fig. 2. Adrenal tumor. Sections show a rather loose succulent connective tissue with a moderate infiltration of large cells that are embryonal in character. Many of these cells show mitotic figures. There are some other smaller round cells in the stroma.

Schmorl's stain for identification of chromaffin cells was negative, therefore a diagnosis of neuroblastoma was made.

Lipoma of the retroperitoneal space as a true lipoma is relatively rare. I have recently operated such a case in a man 47 years of age whose only symptom was inconvenience from enlargement of the abdomen which he attributed to gain in weight. He effected a marked reduction in weight by rigid dietary regime and then it was that he felt a mass in the abdomen. Thorough diagnostic examinations were made including gastrointestinal series, barium enema, gallbladder visualization, liver functional test, intravenous and retrograde pyelography, tests for pancreatic function, renal function, serologic tests for syphilis and blood counts, all of which were normal. By exclusion, a diagnosis of retroperitoneal tumor was made with malignancy as a predominant probability. At operation, a transperitoneal approach was made, and examination revealed the iliac and lumbar fossas completely filled with the tumor. Behind the spleen and attached to the left renal pole was a large mass adherent to the renal capsule. Clinically this was suggestive of

urogenital histogenesis. The mass was attached along the ureters on both sides and required the most meticulous dissection to preserve their walls intact. The tumor was removed in sections, hemorrhage controlled, but no major blood supply had to be sacrificed. The tumor weighed 8,000 Gm. and a pathologic diagnosis of lipoma was returned from the department of pathology (fig. 1).

His convalescence has been uninterrupted and he is rapidly regaining his weight.

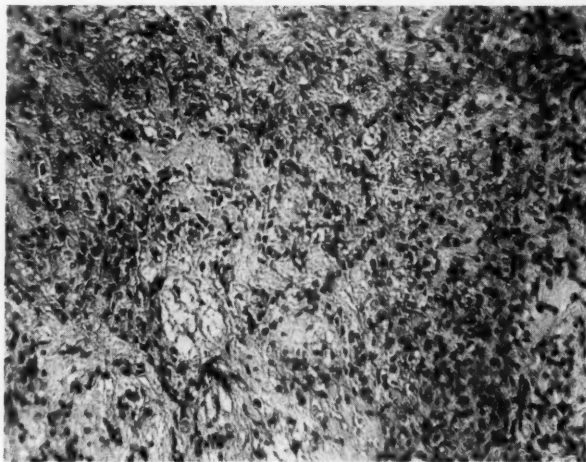


Fig. 3. Metastatic carcinoma. Metastatic carcinoma shows loose succulent stroma with few fat cells. Some areas rather densely infiltrated with atypical epithelial cells with very little differentiation of cells, and many containing mitotic figures.

I have operated upon three cases of sarcoma in the retroperitoneal space in children of one year, two years and twelve years respectively, and one case in which a diagnosis was returned of metastatic carcinoma (fig. 3).

The presenting symptoms in each case as first observed was the prominence of the mass, followed soon by pallor, anemia, loss of weight, and anorexia. These cases are of interest because of the infrequency of round cell sarcoma when separated from lymphosarcomas or leukosarcomas.

Springing from the connective tissue, sarcoma for a short time will retain the characteristics of the parent membrane and then almost meteoric-like, it calls into play its unique power of invading and destroying adjacent structures; of forming new colonies of its own tissue in distant organs, definitely characterized by the rapidity

of growth of these cells and the corresponding increase in the size of the tumor. They are exceedingly malignant and usually choose the lung as a favorite area of metastasis. Sarcoma, here as anywhere in the body, commands a generous supply of blood, hence a most active cell growth. This, together with edema, hemorrhage,

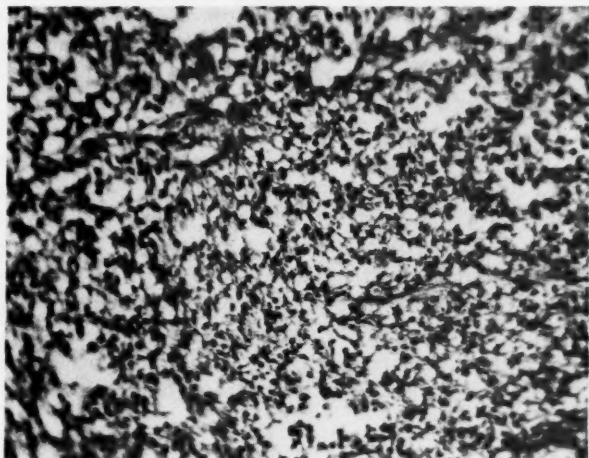


Fig. 4. Mixed cell sarcoma. Section shows loose stroma diffusely infiltrated with connective tissue cells cut at different angles. These cells for the most part have deeply staining nuclei and many show mitotic figures.

Blood vessels show very thin walls.

and mucoid degeneration, account for the enormous size of these tumors in such a relatively short time from the first observation of their presence.

The explanation of such a phenomenon is due to the fact that, after reaching certain limits, the rich blood supply becomes lessened to the point where large areas of the tumor mass undergo necrosis from infarction and a shrinking or regression of the mass becomes obvious. This state of affairs will remain as such until the tumor infiltrates surrounding tissue where it obtains a new vascular supply from new tissues and growth is again resumed.

Often lympho sarcomas are highly radio-sensitive. In central liquefaction necrosis of the mass, infection is quickly seen as a complication and will give rise to chills, fever, sweats, leukocytosis; this will tend to confuse one for a time with the belief that the mass is inflammatory and not malignant.

I recall a boy, of 13 years, who gradually lost weight down to 60 pounds, due to vomiting food. There was no nausea, but after a few hours, the food would return; only thin broth, milk, and water would pass through the duodenum. During our studies, pyloric obstruction was obvious but we felt the obstruction was due to an extraneous pressure from behind the stomach.

When the abdomen was opened, the stomach was pushed forward and a mass could be felt posterior to the pancreas and below it. The posterior peritoneum was opened at the most prominent point, the mass was slightly fluctuant, the walls were thick, the blood count had not indicated pus, probably because of the long standing of the infection. The contents of the mass were removed through a trocar and much to my satisfaction, thick yellowish green pus was evacuated in the amount of 500 c.c. Biopsy was taken from the dependent portion of the cavity. Packing of the cavity was thought safest on account of the low virulency of the infection, the difficulty of removal, and the poor risk of the patient. I was again surprised when the report of the tissue removed came back as round cell sarcoma. More thorough search for lung and other evidences of metastasis were made, all of which were negative.

The cavity closed after two weeks and the pyloric obstruction was relieved. He has gained some 30 pounds in weight in the past year with no evidence of return of any symptoms. Because of the pathologic diagnosis of sarcoma, he was given postoperative radiation therapy. We shall watch this case with increasing interest.

Of the three other sarcomas in children referred to above, two died and one, the oldest, is still living after eighteen months, following removal of tumor and deep therapy.

Summarizing, I should like to emphasize the elusive characteristics of retroperitoneal tumors, growing forward as they do because this is the avenue of least resistance and thus stimulating intraperitoneal tumors. The liver, spleen, and pancreas, should be eliminated and then the retroperitoneal space invaded.

When possible to make a diagnosis, extraperitoneal incision should be used.

Deep radiation therapy is of value following surgical removal of malignant tumors. It is of no value however, in metastasis the lungs or liver.

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PRACTICAL TREATMENT OF EXTENSIVE BURNS, WITH REPORT OF A CASE

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IN offering an additional case report of an extensive burn, to an already abundant literature, it is my intention to claim nothing new in the treatment of burns, but rather to approach the problem from the viewpoint of the surgeon, whose treatment of severe burns is only occasional. The multiplicity of remedies advocated for the treatment of burns, presents a varied armamentarium from which the surgeon may well select that treatment which most nearly approaches the ideal as applied to the individual case.

It should be remembered that an extensive burn is an absolute emergency, the treatment of which admits of no unnecessary delay, and that the materials at hand must be utilized whether they be those most desired or not. Few hospitals furnish immediate access to all of the valuable drugs and paraphernalia which have been advocated in the treatment of this condition.

A reasonable understanding of the pathologic changes brought about by burns is essential to intelligent treatment. It becomes necessary, therefore, not only to consider the local trauma, but to understand and institute adequate treatment of secondary shock, toxemia and infection, as the case progresses and the occasions arise.

PATHOLOGY

It has been demonstrated that the first untoward effect of an extensive burn is secondary shock, accompanied by marked hemoconcentration. While the loss of fluid from the burned skin surface is partly responsible for concentration of the blood, by far the greater role is played by shock, which produces severe arteriolar and venular spasm, with paralysis, dilation and increased permeability of the capillaries, allowing the fluid elements of the blood to pass from the circulatory system into the tissues themselves producing edema, but retaining the cellular elements within the vessels.

These changes are evidenced by increased cell volume, with decreased blood water, chlorides, plasma volume content and plasma protein. Drew, Scudder and Papps¹ have presented four practical laboratory tests which may be made to determine the degree of hemoconcentration. These are:

1. Determination of the cell volume of venous blood by means of the hematocrit.

2. Determination of the specific gravity of the whole blood.
3. Determination of the specific gravity of the plasma.
4. Calculation of the plasma proteins, from the plasma specific gravity, by a simple formula.

If these tests are not available, changes in the hemoconcentration may be roughly followed by hemoglobin estimations and red blood counts.

Blalock² and Martin⁵ have shown that when hemoconcentration reaches 140 per cent, cellular necrosis occurs with important damage to the liver and adrenals. It has been demonstrated that damage to the adrenal glands results in increased blood potassium, (Scudder³); secondary hypoglycemia, Greenwald⁶, and increased permeability of the capillaries (Pöhlman⁴). These conditions resulting from adrenal damage and insufficiency can be benefited by the administration of adrenal cortex extract and vitamin C.

LOCAL TREATMENT

Local treatment, although it does not enjoy the reputation for saving life that general treatment does, nevertheless is important in that it reduces pain, and by minimizing infection promotes earlier healing, lessens keloid and scar formation, and reduces the necessity of skin grafting, thereby lessening morbidity and improving the economic status of the patient. The most important measures are:

1. Thorough debridement.
2. Application of an antiseptic agent, which may be applied separately or combined with
3. The application of a coagulant. Those most commonly employed, in more or less chronologic order of original use, are tannic acid about 5 per cent solution, which is frequently combined with an antiseptic agent such as merthiolate or hexylresorcinol; silver nitrate 10 to 20 per cent solution; gentian violet 2 per cent aqueous solution; triple dye, a mixture of crystal violet, neutral acriflavine and brilliant green, credited with having lethal action against both gram positive and gram negative organisms; and 3 per cent sulfadiazine in 8 per cent triethanolamine. Some form of sulfadiazine bids fair to replace other agents in popularity and effectiveness. These remedies have a common action in forming a protective covering for the burned area, which reduces pain and the loss of body fluids.
4. Wet dressings, immersion of a limb in a mild antiseptic solution such as boric acid, or prolonged general tub baths, may be invaluable in cleaning up infected areas and promoting healing.
5. An oily spray, such as cod liver oil will be found useful in softening and soothing crusted areas and facilitating their removal.
6. Early skin grafts, if indicated.

Regardless of the local treatment selected, it is greatly facilitated and rendered less painful by employing atomizers for liquids, and insufflators for powders.

GENERAL TREATMENT

1. Narcotics to reduce pain and control shock.
2. External heat to conserve body heat.
3. Intravenous saline and forced fluids, to reduce hemoconcentration.
4. Intravenous hypertonic saline, to reduce arteriolar and venular spasm, replace saline lost from the blood, and regulate water balance.
5. Blood plasma intravenously, and high protein diet, to replace plasma and protein loss from the vascular system, to maintain normal blood volume, and prevent circulatory failure.
6. Intravenous glucose, high carbohydrate diet and vitamin C to combat liver and adrenal damage.
7. Adrenal cortex extract to restore capillary tone; raise the blood pressure; adjust the potassium-sodium balance, and redistribute electrolytes.
8. Iron and vitamins to combat anemia.
9. Blood transfusions during convalescence after hemoconcentration has been corrected, to combat infection and to overcome anemia.

Drew, Scudder and Papps¹ warn against the use of large quantities of hypertonic solutions in cases of hemoconcentration in which the hematocrit reading shows more than 60 per cent cell volume, because of the danger of bringing into the circulation, cell water which may be definitely toxic.

It must be remembered that in the early stage of shock, blood plasma or serum, is far preferable to whole blood, since there is already present a concentration of red cells. Plasma also has the advantage of being more quickly available, and the loss of time required for typing is eliminated. Caution should be used not to supply too much fluid, without adequate maintenance of proper plasma and protein level, since fluid may wash out and further deplete an already dangerously low plasma volume.

Regardless of its frequency, perhaps there is no episode in the field of medicine or surgery so dramatic as that of the severely burned patient. The unwilling hero of this absorbing play is precipitated upon the center of the stage with startling suddenness to open the first scene, and never fails to hold the sympathetic interest of his audience until the final curtain is lowered by death or recovery. It is true that the healing art is concerned with the enactment of many dramas. The victim of multiple fractures may be encased in plaster, the desperately ill patient may give varied evidence of the internal struggle for survival, but it remains for the burned patient to expose his misfortune in its entirety.

REPORT OF CASE

A. H., aged 25, afflicted with right spastic hemiplegia since birth, had very largely mastered his handicap by determination and perseverance, and had

become a student-instructor at the Georgia School of Technology. On the afternoon of Dec. 10, 1941, as he was about to direct his class in an experiment on a steam turbine, he turned on the steam control valve, which immediately exploded, drenching him with live steam and hot water. The engineer, in charge of the boiler, happened to be looking at the steam gauge at the time, and saw the indicator suddenly drop from 10 pounds pressure to zero. The victim of this catastrophe walked from the basement laboratory to the main floor and across the street to the school hospital. He was given morphine, gr. $\frac{1}{4}$, and sent by ambulance to a private hospital where I first saw him as he entered on a stretcher. He was conscious and occasionally burst into uncontrollable sobs, which he claimed helped to relieve him.

TREATMENT

He was placed on an operating table, and pantopon gr. $\frac{1}{3}$ given. With the aid of an assistant, his clothes were cut off, and beginning with his face thorough debridement was carried out. By the time his feet were cared for, new blisters had appeared on his face and upper extremities, which necessitated going over him several times. As the debridement progressed, a nurse followed with an atomizer, spraying the denuded areas with hexylresorcinol. This was followed by repeated spraying with 4 per cent tannic acid solution. He was then turned over and his posterior surfaces similarly treated.

Since the chance for survival seemed slight and he appeared to stand the local treatment well, it was deemed advisable to withhold a general anesthetic. For a similar reason it was decided to use hexylresorcinol rather than a mercury derivative because of the possibility of absorption from such an extensive area. It being felt that either a general anesthetic or absorption of mercury might be enough to weigh the balance against recovery.

While the patient was in the operating room, a bed was prepared with a sterile sheet thickly coated with sterile vaseline. An overhead, electrically lighted frame was attached to the bed to support the covers and supply a source of controllable heat. It was unfortunately impossible for him not to lie on burned surfaces. When placed in bed, his pulse was 112 and respiration 30.

Immediate orders were:

1. Blood plasma 250 c.c. intravenously.
2. Pantopon gr. $\frac{1}{6}$ by hypodermic as necessary for pain.
3. Adrenal cortex extract (eschatin) 2 c.c. by hypodermic every four hours.
4. High carbohydrate diet, with dextrose added to fruit juices.
5. Force fluids.
6. High protein diet reinforced with plain gelatine, cream cheese and Mead's protein milk.
7. Cevitamic acid 50 mg. four times daily.
8. Sodium chloride gr. xv, four times daily.
9. Type blood for transfusion.
10. Complete blood counts and urinalysis daily.
11. Record fluid intake and output daily.
12. Tetanus antitoxin ordered but countercommanded because of history of severe reaction several months previously.

PROGRESS

Blisters continued to form for several days, until the burn proved to involve his entire face and front of his neck, both arms and hands to the finger tips, with the exception of a narrow strip about 3 cm. wide, just proximal to the knuckles of his right hand. This, I believe, proved to be a life-saving omission. Fully one-third of his torso was burned, as were the buttocks, genitalia (including the orifice of the urethra), and both legs almost entirely from about 3 or 4 cm. below the inguinal ligaments to the arches of his feet. The soles of his feet were spared. There was approximately 60 to 65 per cent of the entire body surface involved. The accompanying photographs were taken January 28, seven weeks after the accident, and do not show the extent involved. In the photographs his face shows no evidence of having been burned, yet it was entirely crusted with exudate, and he could not be shaved for five weeks. The almost total involvement of his limbs prevented any blood pressure reading, or the obtaining of sufficient blood for hematocrit determinations, and rendered any further intravenous therapy impossible until the fourth day, when a needle was successfully introduced into a small vein on the dorsal surface of his right hand. This needle was supported by gauze and strapped in place with adhesive. His hand was tied to the side piece of the bed, and movement prevented by special attendants for thirty hours, while continuous intravenous infusions of blood plasma, alternating with 5 per cent glucose in normal saline, were given. The patient was unconscious and vomiting when this intravenous therapy was begun, but had regained consciousness, and was able to take fluids and nourishment by mouth, by the time it was terminated. Undoubtedly without this life-saving fluid he could not have survived.

The patient vomited eight hours after the accident, and this continued with increasing frequency until after intravenous therapy three days later, when it was arrested, but reappeared a few days later. Hiccupping began 48 hours after admission and was a prominent and troublesome symptom for a week.

The temperature reached its height of 104° F. by axilla on the fifth day, after which it gradually subsided, becoming normal on the twenty-first day and remaining so thereafter.

The urine contained sugar (3+) the day following the accident, but none thereafter. This is in keeping with work done by Greenwald. Blood sugar determinations were not done. Albumin varied from none at all to a heavy trace. Many hyaline and granular casts were reported the day following the accident, and were present a month later though in greatly diminished numbers.

On December 19 sulfadiazine, gr. xv with equal amount of sodium bicarbonate by mouth, was ordered. The following day the urine contained innumerable red blood cells. Sulfadiazine was discontinued until December 28, when it was again given without untoward effect.

The white blood count remained above 11,000 for a month, the highest count reported was 29,500 with 84 per cent segmented cells on December 27. Sulfadiazine was again given by mouth, and the temperature and white blood count approached approximately normal levels within a few days.

The red blood count varied between 5,360,000 and 3,600,000. The hemoglobin between 103 per cent and 70 per cent. The lower figures being reported several weeks after the accident.

December 13 continual hiccupping and frequent vomiting occurred. He could not be aroused. He voided involuntarily. Intravenous normal saline

and glucose was begun at 4:30 P. M. An antiseptic was applied to the rubber tubing of the saline set, and blood plasma needle introduced into tubing. By alternating the two, 1000 c.c. of blood plasma and 3000 c.c. of normal saline and glucose were given during a thirty hour period. Thereafter twenty-four hour fluid intake was maintained between 4000 and 4500 c.c. and output between 1500 and 2000 c.c.



Fig. 1. The appearance of the patient on Jan. 28, 1942, 49 days after the burn. Although the face and neck look normal in this photograph, they were at first involved in a second degree burn which caused so much crusting and exudate that he could not be shaved for five weeks. At least a third of the trunk and almost all of the upper extremities were covered with burns of varying degree; what shows in the picture is largely the scarring of the third degree burns. This was more marked on the left side: probably he turned to the right in his effort to escape the blast of steam. The deep burns of the thighs also show well.

Note his good general condition.

December 15. Five grains of an iron preparation was given three times daily with fluids.

December 18. Edges of eschars were clipped as they separated and gentian violet 2 per cent aqueous solution applied. Wet boric acid dressings were applied to the arms and legs. The limbs were occasionally soaked in boric acid solution.

December 21. Tub bath at 100°F. for 30 minutes. This proved to be a very upsetting experience, since a portable tube was not available, and lifting the patient in and out of the tub was both difficult and painful. The pain was only controlled after half a grain of pantopon had been given hypodermically, with chloral hydrate gr. xx, and sodium bromide gr. xl per rectum. The patient refused further tub baths until a stretcher that he devised had been obtained. This consisted of a triple sheet 6 by 6 feet, attached to iron pipes at the sides. This improvised stretcher was placed under him, and the pipes rolled up close to him. He was carried to the tub, the pipes being supported on both ends on the tub were unrolled, which lowered him into the water. This process was reversed in putting him back to bed.

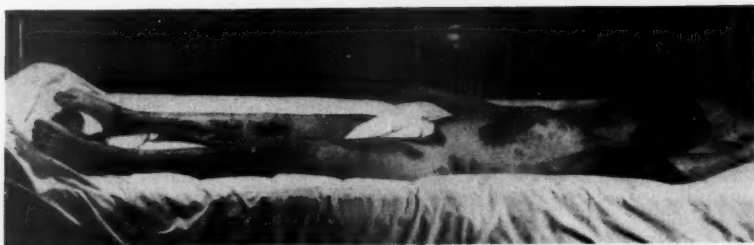


Fig. 2. Photograph on Jan. 28, 1942. The healing of the third degree burns of the legs and of the left side of the trunk are evident.



Fig. 3. Posterior view on the same day. The third degree burn of the left upper extremity, part of the back, the buttocks and legs, and the pressure sore of the right heel are evident. The first and second degree burns are not seen.

December 20. Sulfadiazine powder was sprayed on all raw surfaces frequently. The crusted areas were sprayed with cod liver oil.

December 28. A. H. had been uncomfortable and slightly irrational at times for several days. Sulfadiazine gr. xv was administered by mouth, every four hours.

December 31. He was much improved, temperature normal. The burned areas were healing beautifully.

Jan. 2, 1942. An abscess on the dorsal surface of the right hand at site of the intravenous needle, was incised and drained under procaine anesthesia. About an ounce of pus was obtained. Wet boric acid dressings were applied to hand. The right (spastic) hand was tightly clenched, the nails cutting into palm. A small roll of 3 inch bandage soaked in vaseline was gradually worked

into the palm, the bandage roll enlarged daily. Vaseline gauze was placed between the fingers to prevent webbing.

January 10. A tub bath was ordered every second day. The overhead tent was removed.

January 13. He was shaved and allowed up in a chair.

January 15. He was transferred by ambulance to the Georgia Tech Hospital, five weeks after accident. The burns were entirely healed, except for several areas 1 to 2 cm. in diameter.

January 22. He was able to walk around.

February 10. Burns were entirely healed. A small pressure sore on right heel was not yet healed. The patient was having attacks of nervousness with cramping of spastic limbs, but they were becoming less frequent and less severe. Otherwise he was feeling well.

February 12. A. H. was able to walk outdoors. The urine was negative for sugar, albumin, and casts.

Red count 4,600,000; hemoglobin 72 per cent; white blood count 9,000, with 59 per cent segmented cells.

It is my belief that Hippocrates may well have been inspired by the predicament of the severely burned patient when he wrote

Life is short
And the art long
The occasion instant
Experiment perilous
Decision difficult.

SUMMARY

1. A rational treatment for extensive burns, based on the pathologic processes produced, has been compiled and presented.

2. A case is reported in which 60 to 65 per cent of the body surface was burned.

3. Ideal treatment could not have been carried out in this case, because of the involvement of the sites generally utilized for intravenous therapy.

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DUCTUS LIGANDUS EST?

There is no more brilliant achievement in recent surgical history than the ligation of the patent ductus arteriosus. Thirty-one years after this operation was seriously suggested, Robert E. Gross¹ announced that it had been accomplished. On the other side of the continent a group² who had been unable to secure permission to attempt such an operation until Gross announced his success, quickly followed suit. It would be interesting to know just how often this operation has been attempted in the last four years and with what results: many of us have heard of one or more unpublished cases. It has certainly been established in the surgeons' repertoire. In December, 1939, Bullock, Jones and Dolley² in Los Angeles reported 11 ligations with one death. In December, 1941, Gross³ in Boston reported 30 with 2 deaths. One may gather from these series that, in competent hands, at this time the mortality attendant upon surgical ligation of the ductus should not exceed 10 per cent, and perhaps with further surgical experience and a better selection of cases the mortality may in the future be reduced even further.

We are not concerned in this paper with the diagnosis of patent ductus arteriosus, for adequate discussions will be found in many textbooks and in the references already quoted. Suffice it to say, the diagnosis is not particularly difficult and, when the patient has survived infancy, one can usually determine with reasonable assurance the presence or absence of other lesions of consequence. Neither are we concerned here with operative technic for that has already been described more than once and, not surprisingly in view of its short history, variations are still appearing. Assuming then that the diagnosis is not difficult and that the operative mortality

is not excessive, what are the indications for ligation of the ductus arteriosus?

Is the ideal time for the operation early childhood, adolescence, early adult life or later?

There is considerable room for argument. The ductus has been ligated without difficulty at 22 months. Although extreme youth is thus no bar to the operation, there is some evidence that the ductus may become spontaneously obliterated at three or four or even five years of age. In general then, it would seem best not to operate too early.

Experience has proved time and again that the ligation of a patent ductus arteriosus in a poorly nourished, poorly developed adolescent may be expected to make him a healthy specimen.

Many a patent ductus, in effect an arteriovenous fistula, throws a heavy burden on the left ventricle which may not be able to stand the gaff. It is not surprising then that a considerable number of persons with this anomaly die of a failing heart.

Should the ductus be ligated routinely to take the extra load off the heart? Or should the operation be delayed until definite symptoms of circulatory failure develop?

In many of the reported cases of patent ductus, infection has been responsible for a fatal outcome.

If the circulatory status is satisfactory, should the operation be done to forestall the development of subacute bacterial endocarditis or endarteritis?

Is the risk of death from operation less than the risk of death from subsequent endarteritis? Will ligation prevent such infection? Is it possible that overemphasis has been placed on the theory that "shutting off the anomalous stream of blood flowing into the pulmonary artery [lessens] the formation of thickened endothelial plaques within a pulmonary artery which are likely to be the site of later bacterial infection"?

Is the operation justified when there is definite evidence of endarteritis? Apparently ligation in such cases when infection is not of long standing has often been life saving. When such infection has been present for some time, however, it may have resulted in extreme friability of the vessel wall so that rupture during the operation is likely, whereas chemotherapy may prolong life fairly comfortably for a number of months.

As we see it, the question of routine ligation of the ductus arteriosus must be settled by the careful study of reliable statistics. We

know that in a standard series² (dropping those who died in infancy and adding four others from a large series of autopsies) "69 persons (86 per cent) died as the result of the congenital lesion . . . 6 died from other causes." Twenty-three of these 80 persons passed 40 years, 2 living to be 66. IF 86 per cent out of every 100 who survive infancy with a ductus arteriosus still patent will die as a result of that uncorrected defect, whereas only 10 will die if operation is done routinely, obviously the conscientious physician must advise routine operation as a prophylactic measure.

However we believe with Bullock² "There is an urgent need for the recording of unselected cases from autopsy series." Only a small percentage of the general population comes to the autopsy table and, of those who do, in the absence of a history of cardiac symptoms many anomalies may be overlooked. On the other hand routine autopsies in the Army and Navy will give no data as to the incidence of such maldevelopments for all such cases should have been sifted out by repeated physical examinations. From the time that Leonardo Botallo described the ductus four centuries ago until Gross showed that something could be done about it four years ago, there was no general interest in this structure; there was no incentive to report cases unless they were complicated as by the very interesting and rather too fashionable infection of the arterial walls. Granting that the statistics of less than 100 autopsies of persons who have survived infancy have been interpreted to indicate that a majority died as a result of a failing heart, the position can also be upheld that no one is ever dead until his heart fails. Since two persons with this anomaly are known to have lived to the age of 66, others, perhaps many others, may have lived to a greater age. As Dr. Isidore Cohn brought out in these pages last summer, statistics have to be taken with care.

Let us look at some clinical data: last summer there appeared (from the home-town of Gross, by the way) a very fine book entitled *The Heart in Pregnancy and the Childbearing Age*.⁴ In "nine apparently uncomplicated cases" of patent ductus at the Boston Lying-in Hospital the authors report 24 pregnancies: "no mother has died and none has developed congestive heart failure." The senior author has followed three uncomplicated private cases in primiparas through pregnancy and in a general cardiologic consultation he has seen several women in good health with a patent ductus arteriosus who gave a history of one or more successful and uneventful pregnancies. Hamilton and Thompson⁴ from their own experience, as well as from everything they can find in the literature, do not feel that patent ductus arteriosus is a matter of particular importance so far as parturition is concerned.

This writer would like to epitomize three more cases of "apparently uncomplicated ductus arteriosus" now under his observation:

CASE 1. Mrs. S., the daughter of a physician, had always been restricted in her activities by her father, though she had never realized any necessity for such restriction. When she became pregnant in 1938 an obstetrician, with the complete moral support of her father, not only performed an abortion but also sterilized her. As might have been anticipated, Mrs. S. now wants a baby more than anything in the world; otherwise she is enjoying excellent health.

CASE 2. Bill C. won his letter in football, basketball, baseball and swimming at high school, his parents having released the school authorities from all responsibility as to his heart. Going to college primarily to secure an education, he only indulged in one branch of intercollegiate athletics (having also himself signed a waiver), but in that he was pre-eminent. In the three years since graduation he has continued to enjoy excellent health except for an uneventful appendectomy last summer.

CASE 3. Mrs. W. has three children living and well and continues to do her own cooking, laundry and house work.

It is true that none of these three persons has yet reached 30: it is of course possible that all three will yet die of cardiovascular complications. Each has been told that his murmur can be eliminated by operation, but none has yet been advised to submit to surgery.

May we repeat, patency of the ductus arteriosus after infancy is not a common condition. The data have not yet been collected to enable one to determine the seriousness of the lesion. Often the subjects of this anomaly are poorly nourished and poorly developed, not infrequently they die of myocardial insufficiency, and often they die of subacute bacterial endocarditis or endarteritis. Surgical ligation of the ductus should not carry a mortality of more than 10 per cent, should not require more than two weeks of hospitalization. On the other hand patent ductus arteriosus is not incompatible with 66 years of life, nor with repeated child-bearing, nor with strenuous competitive athletics. Indeed Sir Thomas Lewis⁵ even goes so far as to say, "the condition in itself is not serious."

Operation will increase cardiac reserve. Should it be done before there is evidence of failing circulation? Will operation lessen the incidence of subacute bacterial endocarditis or endarteritis?

Will operation, once such infection has developed, do more harm than good?

L. MINOR BLACKFORD, M. D.

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WRITER'S PALSY

This dread disease has been mildly endemic in the South lo these many years. In the past year its virulence has been intensified: at the fall meeting of the Texas Surgical Society only five papers were turned over to its official organ for publication. Conditions have been grave among other potential contributors, so grave that we had to summon in consultation Dr. Sanders and Dr. Hancock. When these gentlemen had rallied shock troops from Memphis and Louisville (we fear we are mixing metaphors), we were able to publish the first three numbers of 1942. For the first time in the eleven years of its publication *THE SOUTHERN SURGEON* has been late,—late three times running! We offer our humble apologies.

After prolonged consideration we are inclined to think that the etiologic factor responsible for this exacerbation of writer's palsy in this belligerent South of ours is the War,—at least everything else is being blamed on the War. However we are not discouraged for, as will be seen in the early pages of this issue, a splendid program has been arranged for the Postgraduate Surgical Assembly in March, and the papers read before this meeting will serve for a number of months. Before they have all been published we hope that surgical authors will have learned that after the initial plunge (there we go, mixing our metaphors again), War is not too bad,—not bad enough to keep one from both studying and writing.

And, as Dr. Beasley remarked last year *WHEN A DOCTOR COMPLETES HIS MEDICAL EDUCATION HE SHOULD RETIRE*, so come to the party.

BOOK REVIEWS

The Editors of THE SOUTHERN SURGEON will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The Editors do not, however, agree to review all books that have been submitted without solicitation.

DISEASES OF THE BLOOD AND ATLAS OF HEMATOLOGY, WITH CLINICAL AND HEMATOLOGIC DESCRIPTIONS OF THE BLOOD DISEASES INCLUDING A SECTION ON TECHNIC AND TERMINOLOGY. By ROY R. KRACKE, M. D., Professor of Bacteriology, Pathology and Laboratory Diagnosis, Emory University School of Medicine; Pathologist to the Emory University Hospital, Consultant in Hematology to the Grady Hospital and Eggleston Hospital for Children, Atlanta; Formerly Director of the Hematological Registry, American Society of Clinical Pathologists. Second Edition, Thoroughly Revised, Reset and Enlarged. 100 illustrations, including 50 color plates. Philadelphia: J. B. Lippincott Company, 1941.

It is not without satisfaction that the reviewer recalls that he published the first review of the first edition of Dr. Kracke's book on the blood (December, 1937) and that the high praise he gave it was overshadowed by the encomiums of subsequent reviewers. It is with genuine pleasure that he notes it now termed a classic.

The second edition in less than four years makes good the omissions that must occur in the first edition of any book when it attempts to cover such a broad field and also brings out the advances made in hematology since then. The splendid plates of Mrs. Garver's are retained and several new colored drawings by Miss Baker have been added. Francis Parker contributes an adequate chapter on transfusion,—of such vital importance in times like these, and other celebrities have also been called on for sections.

The first edition of this work was designed primarily for clinical pathologists. The laboratory men were so enthusiastic about it that they spread the news to their friends in practice, both surgical and medical, and it was probably for this reason the first edition was so quickly exhausted. The second edition is even more aimed at the clinician and this reviewer predicts that its popularity will be even greater.

SURGICAL PRACTICE OF THE LAHEY CLINIC. 897 pages, with 376 illustrations. Price, \$10. Philadelphia and London: W. B. Saunders Company, 1941.

In his preface Dr. Lahey says that, although the book is made up of a collection of articles which have appeared in the various journals, it affords one a true cross-sectional view of the practices of his Clinic. One of the policies there is a standardization of operative procedures, since he believes that only through repetition of the same surgical procedure can one expect to obtain the best results with it. The contents include surgery of the thyroid gland, esophagus, larynx, trachea and lungs, breast, stomach, duodenum and small intestine, the biliary tract, the large colon, the pelvis, the kidney and prostate gland, the bones and joints, spinal cord and nerves, and anesthesia. The various contributors go into technical detail and include illustrative case histories, statistical surveys, and the latest thought in surgery.

The first section, largely written by Dr. Lahey himself, is devoted to diseases of the thyroid. It includes excellent discussions of intrathoracic goiter, the management of hyperthyroidism complicated by other conditions, recurrent hyperthyroidism, and the treatment of the "thyrocardiac." There are several

papers on technic and a fine one on carcinoma of the thyroid: their statistics on this are distinctly encouraging.

Again in the sections on the upper abdomen Dr. Lahey contributes largely. He is an earnest advocate of partial gastrectomy in the surgical treatment of duodenal ulcer. With the passage of years he grows more emphatic in condemning gastro-enterostomy. It is impressive to learn that only 8.2 per cent of patients with duodenal ulcer are submitted to surgery. He has not accepted the Meulengracht method of treating peptic ulcer with massive hemorrhage: in the paper on bleeding ulcer we are told that the mortality was 4.6 per cent and that the majority of patients were treated by conservative measures: we are not told how many were treated medically and how many of them died, nor if there was a significant variation in the mortalities of the several surgical procedures.

A section of 150 pages is given to the colon and rectum. It is strange that the medical public has not yet learned to diagnose cancer of the large bowel in its early stages.

In the remainder of the book, although Dr. Lahey does not write a great deal, is good solid matter. The three papers on the kidney and prostate are especially good and one is struck by the amount of space devoted to anesthesia.

To sum up: the book consists of a number of papers from the Lahey Clinic, most of which have been published in professional journals of the last three years. There is therefore no claim that it contains anything startlingly new. On the other hand the methods described in this book are those that have stood the test of time and the reviewer certainly would not disagree with Lahey as to the value of standardizing procedures. The papers are clearly written, the illustrations are quite adequate. The whole book bears the stamp of approval and the average surgeon may well be thankful to be able to find here, not a dozen different ways in which an end may perhaps be accomplished, but one way that has passed the pragmatic test with flying colors, one way that not only works but works well.

PSYCHOSURGERY: INTELLIGENCE, EMOTION AND SOCIAL BEHAVIOR FOLLOWING PREFRONTAL LOBOTOMY FOR MENTAL DISORDERS. By WALTER FREEMAN, M. D., Ph.D., F.A.C.P., Professor of Neurology, George Washington University, Washington, D. C.; and JAMES W. WATTS, B.S., M.D., F.A.C.S., Associate Clinical Professor of Neurosurgery, George Washington University, Washington, D. C., with special psychometric and personality profile studies by THELMA HUNT, M.D., Ph.D., Associate Professor of Psychology, George Washington University, Washington, D. C. 335 pages, with 81 illustrations. Price, \$6. Springfield and Baltimore: Charles C Thomas, Publisher, 1942.

To operate on a disordered brain in the hope of restoring sanity seems an entirely logical thing to do in the opinion of the average layman, and yet to the average physician it appears unthinkable. Certainly it lends itself to lurid reporting in the Sunday papers, and such publicity makes the doctor even more averse to the idea. Of course the medical profession must be a bit conservative,—we have our crackpots and we have seen numerous innovations peter out. On the other hand we cannot afford to be too conservative: it is not scientific to dismiss novelties without investigating them to find out what they are worth,—if anything. We welcome the opportunity then to quote from the preface of this new book, Psychosurgery:

"Operations upon the brain are by no means to be applied indiscriminately in the treatment of functional mental disorders. In fact, in view of certain unfortunate results, the operation of prefrontal lobotomy is reserved for those patients whose outlook for recovery is poor, whose response to other treatment is unsatisfactory, and for those who are facing disability or suicide. Not always does the operation succeed, and sometimes it succeeds too well, in that it abolishes the finer sentiments that have kept the sick individual within bounds of adequate social behavior. What may be satisfactory for the patient may be ruinous to the family. It is in part from a desire to instill caution that our bad results have been emphasized, and it is hoped that our experience will be a guide to the correct choice of individuals to be operated upon."

After reading this book carefully the reviewer feels that the authors have something there. He is quite satisfied that not every person who behaves irrationally should be submitted to lobotomy; he is equally satisfied that no person should be put through such an operation without a very careful preliminary study including psychiatric work-up. Indubitably the authors agree with him thoroughly. If the reviewer did not agree as to whether certain individuals were or were not suitable candidates is a matter of no moment. Doctors Freeman and Watts admit regrets that they have operated on some of their patients and doubtless their criteria are changing from time to time. Yet the reviewer is quite convinced that in some cases the section does enormous good.

Three years ago *THE SOUTHERN SURGEON* published one of the first papers on the subject ever to appear in this country. It was done not without trepidation: it was done because we knew Dr. Lyerly was not the biggest liar in the world and because his movies were impressive. It is with great pleasure therefore that we welcome this book by men who even preceded Lyerly. We believe that it is of scientific value and that it is a milestone in the treatment of insanity.

SYNOPSIS OF THE PREPARATION AND AFTERCARE OF SURGICAL PATIENTS.

By HUGH C. ILGENFRITZ, M. D., Instructor in Surgery, Louisiana State University School of Medicine; Visiting Surgeon, Charity Hospital of Louisiana at New Orleans, and RAWLEY M. PENICK, JR., M.D., F.A.C.S., Professor of Clinical Surgery, Louisiana State University School of Medicine; Visiting Surgeon, Charity Hospital of Louisiana at New Orleans, with Foreword by URBAN MAES, M.D., D.Sc., F.A.C.S., Professor of Surgery and Director of the Department, Louisiana State University School of Medicine, etc. 532 pages, with 55 illustrations. Price, \$5. St. Louis: The C. V. Mosby Company, 1941.

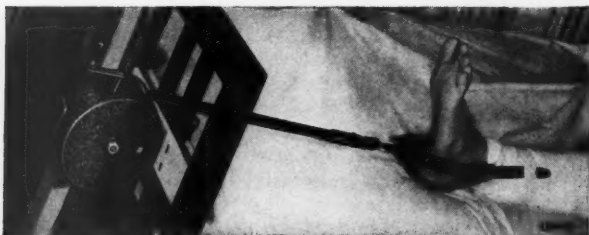
On first picking up this book and finding that Dr. Maes had only contributed one page, one wondered why his name was included on the cover. Reading that page however enabled one to understand why. He says, "In recent years there has not been great progress in actual operative procedure. Only details change. The greatest advances have been made in the physiologic aspects of preoperative and postoperative care, as, for example, in the treatment of intestinal obstruction. . . . It is obvious that much of the future progress in surgery will develop from closer cooperation between the scientific investigator and the practicing surgeon. . . . With the help of the various preclinical and collateral sciences, certain details of preoperative and postoperative care have become standardized and established upon a sound physiologic basis. . . ."

"The facts presented are not intended as rules not to be violated, but as a summary of the most useful knowledge we have at this time."

The real authors express their "deepest appreciation and gratitude" to Dr. Maes "for his inspiring cooperation." It is evident that his mature judgment has had a profound influence throughout the book. And this is in no way to depreciate the magnificent job that Ilgenfritz and Penick have done.

Physiology pervades the book. The first half deals with fluid and electrolyte balance (including the use of plasma), shock, transfusion, general preoperative and postoperative measures, systemic complicating factors, organic diseases, minor or major postoperative complications. The second half concerns itself with wounds and fistulas, operations on the chest, the nervous system, the extremities. It then goes on to deal with the stomach and duodenum, the small intestine and appendix, the large bowel, the biliary tract and the thyroid. The appendix discusses new chemotherapeutic agents, diet lists, etc.

This book is written clearly, concisely and with freshness and enthusiasm. It arouses the enthusiasm of this somewhat jaded reviewer, who agrees with Dr. Maes that it presents "a summary of the most useful knowledge we have at this time." It should prove worth its weight in gold to house officers on surgical services, even though they should have been exposed already to most of the knowledge contained in it. On the other hand, many a man who has been doing good surgery for 20 years may be able to do even better and more modern surgery after a careful study of it.



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